MONTECH®

SERVOLINE Handling Components

Servo Horizontal Unit SHE

Servo Vertical Unit SVE

USER MANUAL

MECHANICAL PART SHE-130

MECHANICAL PART SVE-130

506920ENG

Edition 10/05

Change index

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Table of contents

1. Important information 1-1
1.1 Introduction 1-1
1.2 EU conformance (to MRL Appendix II A) 1-1
1.3 Product description and application 1-1
1.4 Dangers 1-1
1.5 Additional information 1-2
1.6 Validity of the User Manual ..... 1—2

2. Technical data ..... 2—3
2.1 Servo horizontal unit SHE-130 ..... 2—3
2.1.1 Dimensioned drawing of SHE-130 2—4
2.1.2 Load calculations for SHE-130 2—5
2.1.3 Traversing times for SHE-130 2—7
2.2 Servo vertical unit SVE-130 ..... 2—8
2.2.1 Dimensioned drawing of SVE-130 2—9
2.2.2 Dimensioned drawing of SVE-130-EK 2—10
2.2.3 Load calculations for SVE 2—11
2.2.4 Traversing times for SVE-130 2—12

3. Installation ..... 3—13
3.1 Mechanical design ..... 3—13
3.1.1 Design of the system 3—13
3.1.2 Installation position and assembly 3—13
3.1.3 Combination of SHE-130 and SVE-130: 3—15
3.2 Leading through cables and hoses from supplementary devices ..... 3—15
3.3 Connecting the motor cable and resolver cable ..... 3—18
3.4 Connecting the inductive proximity switch ..... 3—19

4. Maintenance ..... 4—20
4.1 Lubrication ..... 4—20
4.2 Setting the slide play ..... 4—21
4.3 Changing the inductive proximity switch (460) ..... 4—22
4.4 Changing the slide and drive elements ..... 4—23
4.4.1 Changing the ballscrew (30, Fig. 25) 4—24
4.4.2 Changing the clutch (210, Fig. 26) 4—28
4.4.3 Changing rollers (430) and shafts (80) (Fig. 28) 4—30

5. Spare parts ..... 5—33
5.1 Servo horizontal unit SHE-130 ..... 5—33
5.2 Servo vertical unit SVE-130, SVE-130-EK ..... 5—36
5.3 Spindle assembled ..... 5—39
5.4 Joint assembled ..... 5—40
5.5 Complete energy conducting carrier ..... 5—41

6. General information ..... 6—42
6.1 Environmental compatibility and disposal ..... 6—42

1. Important information

1.1 Introduction

This operating instruction describes the mechanical design, load limits, assembly, maintenance and spare parts of the Servo Horizontal Unit SHE-130 and of the servo vertical unit SVE-130. It forms an integral part of the operating instruction for the servo amplifier and the operator software.

1.2 **EU conformance** (to MRL Appendix II A)

Regulations and standards taken into account:

- EU Directive on machines 89/392/EEC, 91/368/EEC

Manufacturer:

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1.3 Product description and application

The Servo Horizontal Units SHE-130 and Servo Vertical Units SVE-130 are electrically operated, position-controlled linear units which can be used as individual horizontal or vertical units and in combination as a 2-axis loader. The Servo Horizontal Units SHE-130 can be used exclusively for horizontal movements.

Provided that the load limits defined in the technical data are complied with, any devices can be mounted on the servo horizontal units and servo vertical units.

1.4 Dangers

The use of servo horizontal units SHE-130 and servo vertical units SVE-130 in equipment is permissible only if they are protected by **movable, separating protective devices according to EN 292-2, Section 4.2.2.3**. Failure to observe this safety measure can result in injuries due to crushing and impact. The operating conditions and safety notes described in the operating instruction. It is absolutely essential to keep within the stated load limits.

Important!

Never allow devices to run without mounted covers and hoods.

During operation, the surface of the motor can reach 100°C. Do not touch the motor until the temperature has dropped below 40°C (measure the surface temperature). During maintenance work on the servo horizontal unit or on the servo vertical unit, ensure that the power to the drive is switched off. The servo amplifier must be disconnected from the supply voltage. Switch off the main switch or mains contactor.

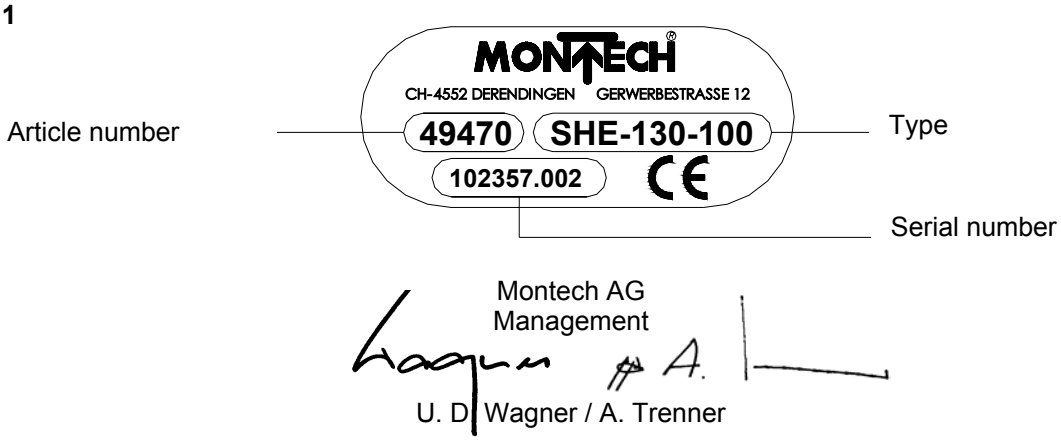
- **Switch off the enable signal**
- **Switch off the power supply (L1, L2, L3)**
- **Ensure that no unauthorized switching-on of the supply voltage can occur.**

Failure to observe these safety measures may result in death or serious personal injuries or material damage.

1.5 Additional information

The present User Manual is intended to permit proper and safe use of the servo horizontal unit SHE-130 and the servo vertical unit SVE-130. Should you lack any information for your particular application, please contact the manufacturer.
When reordering user manuals, it is imperative that you quote the serial number (see Fig. 1). Single copies are provided free of charge.

Fig. 1



1.6 Validity of the User Manual

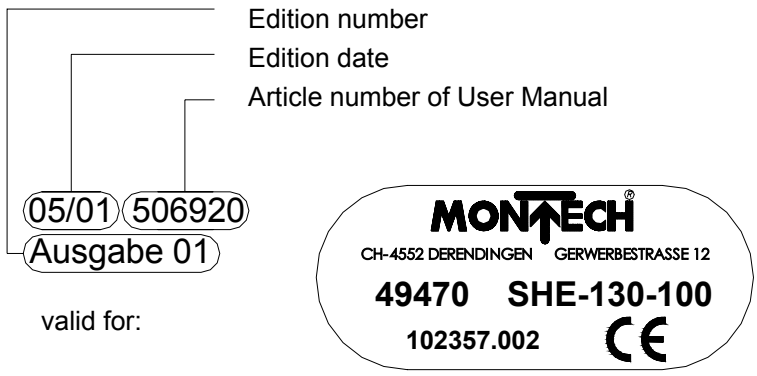
Our products are continually updated to reflect the latest state of the art and practical experience.

In line with product developments, our user manuals are continually updated.

To avoid confusion, check that the present User Manual is valid for the servo horizontal unit SHE-130 or servo vertical unit SVE-130 to be commissioned.

Every User Manual has an edition number, e.g. 506920 (Fig. 2). The label affixed to the title page shows the product serial number for which the edition number on the User Manual is valid.

Fig. 2



2. Technical data

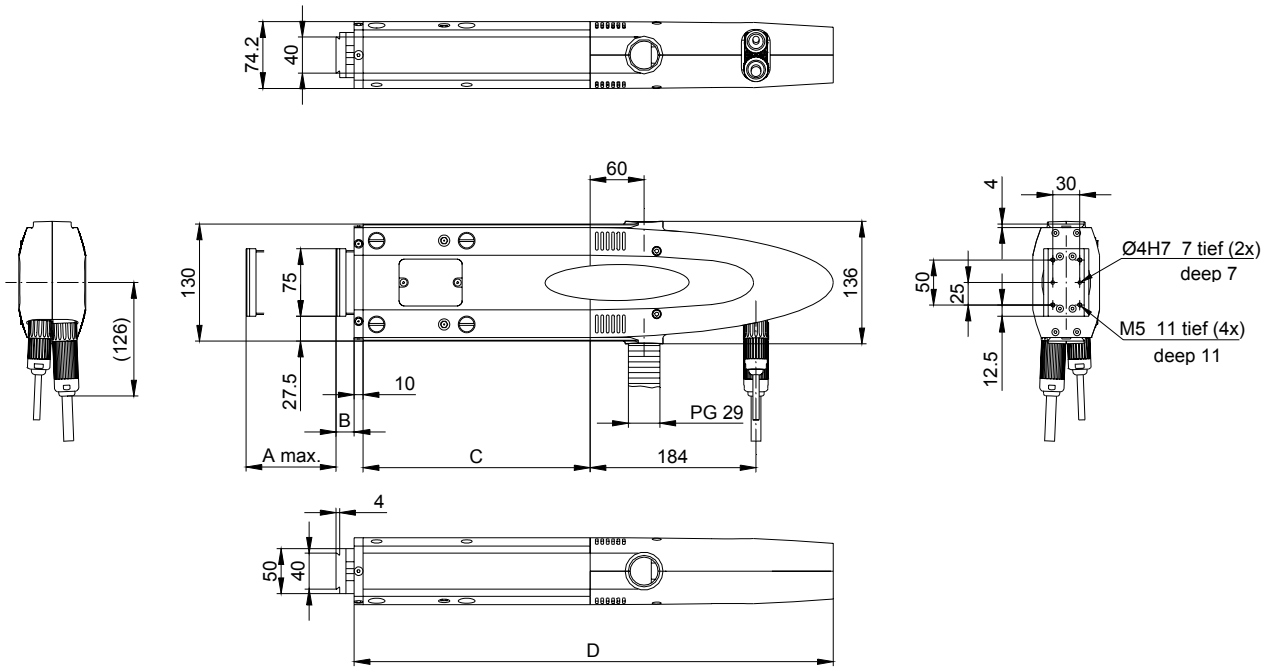
2.1 Servo horizontal unit SHE-130

			SHE-130-100	SHE-130-200	SHE-130-300
Max. stroke		[mm]	100	200	300
Max. permissible mounting mass		[kg]	12	12	12
Max. stat. moment M_{0Xmax}	1)	[Nm]	15	15	15
Max. stat. moment M_{0Ymax}	1)	[Nm]	65	65	95
Max. stat. moment M_{0Zmax}	1)	[Nm]	30	30	45
Max. force F_{Xmax}	1)	[N]	120	120	120
Max. speed		[mm/s]	1000	1000	1000
Max. acceleration	2)	[m/s^2]	6.5	6.5	6.5
Own weight		[kg]	5.2	6.2	7.7
Drive			Highly dynamic synchronous servo motor		
Rated motor power		[W]	130		
Enclosure protection for servo motor			IP64		
Transmitter system			Resolver		
Repeatability	3)	[mm]	+/- 0.01		
Reference position proximity switch			Integrated inductive proximity switch PNP		
Sound level		[dBA]	< 68		
Max. operating temperature of motor	4)	[°C]	56		
Ambient conditions Temperature		[°C]	10 – 50		
Rel. humidity			5% ... 85% non-condensing		
Air purity			Normal workshop atmosphere		
Warranty period			2 years from the date of delivery		
Installation position			Horizontal		
Material			Aluminium, steel, plastic		

1) See load calculations
2) At max. permissible mounting mass
3) At constant motor temperature. Measured at max. load, max. speed and 100 successive strokes
4) At 20°C ambient temperature, full load and continuous operation

2.1.1 Dimensioned drawing of SHE-130

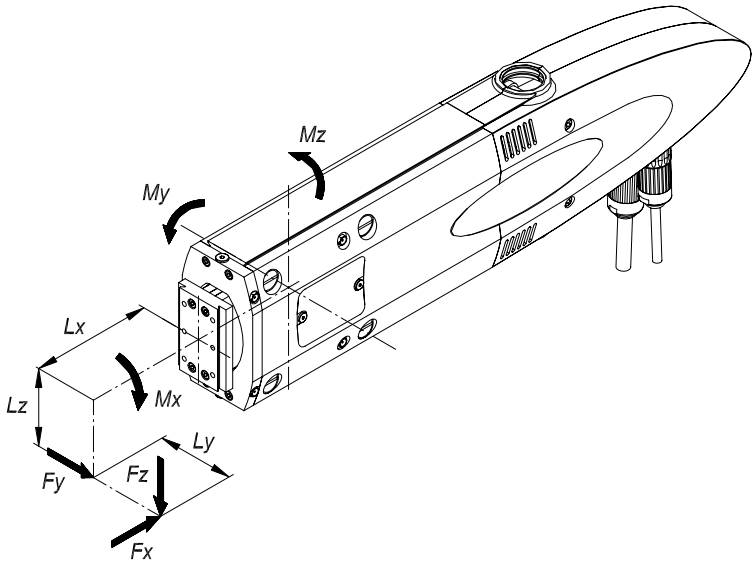
Fig. 3



	A max. [mm]	B [mm]	C [mm]	D [mm]
SHE-130-100	100	20 - 120	252	532
SHE-130-200	200	20 - 220	352	632
SHE-130-300	300	20 - 320	502	782

2.1.2 Load calculations for SHE-130

Fig. 4



a) Dynamic load

$$M_X = 0.001 \cdot m \cdot g \cdot L_Y$$
$$M_Y = 0.001 \cdot m \cdot (g \cdot (L_X + K_X) + a \cdot L_Z)$$
$$M_Z = 0.001 \cdot m \cdot a \cdot L_Y$$

Combined dynamic load:

$$B = \frac{M_Y}{M_{Yper}} + \frac{M_X + M_Z}{28} \leq 1$$

b) Static load

$$M_{0X} = 0.001 \cdot (F_Z \cdot L_Y + F_Y \cdot L_Z)$$
$$M_{0Y} = 0.001 \cdot (F_X \cdot L_Z + F_Z \cdot (L_X + K_X))$$
$$M_{0Z} = 0.001 \cdot (F_X \cdot L_Y + F_Y \cdot (L_X + K_X))$$

Combined static load:

$$B_0 = \frac{M_{0X}}{30} + \frac{M_{0Y}}{M_{0Yper}} + \frac{M_{0Z}}{2 \cdot M_{0Zper}} \leq 1$$

B, B_0:	Load factor: **Must not exceed the value 1!**
M_i, M_{0i}:	Existing moments [Nm]
M_{iper}, M_{0iper}:	Permissible moments [Nm] (see Table)
m:	Mounting mass [kg]
L_X, L_Y, L_Z:	Distance of moving mass from centre of gravity or force application distances [mm]
F_X, F_Y, F_Z:	Forces acting [N]
a:	Acceleration of the unit [m/s^2]
K_X:	Constant according to Table [mm]

	K_X [mm]	M_{Xper} [Nm]	M_{Yper} [Nm]	M_{Zper} [Nm]	M_{0Xper} [Nm]	M_{0Yper} [Nm]	M_{0Zper} [Nm]
SHE-130-100	195	10	53	6.5	15	65	30
SHE-130-200	295	10	53	6.5	15	65	30
SHE-130-300	420	10	79	6.5	15	95	45

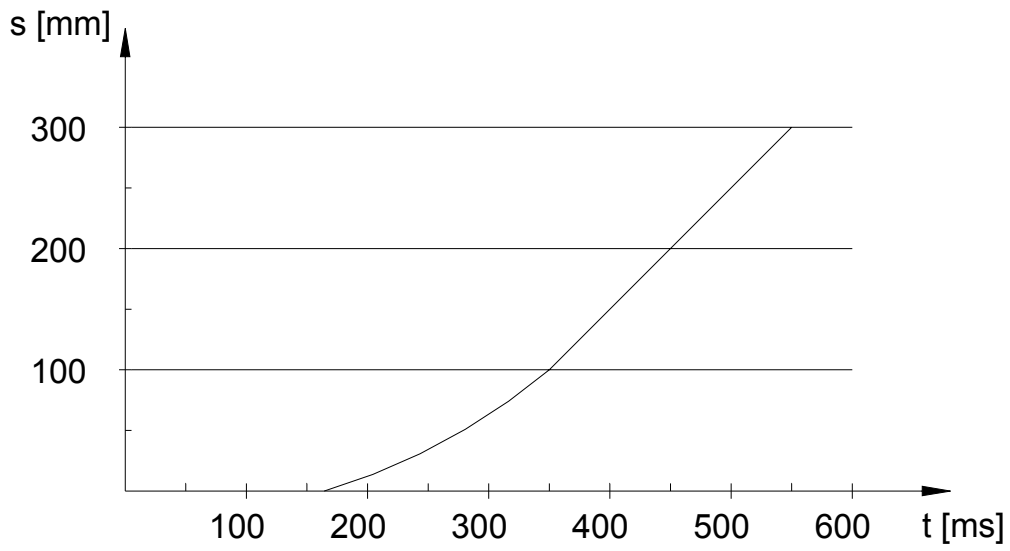
2.1.3 Traversing times of SHE-130

The traversing times were determined for an SHE-130-300 under the following conditions:

- Load: 12 kg
- Speed: 1000 mm/s
- Acceleration or deceleration: 6.5 m/s^2
- Beginning of measurement: Start signal at input X11B/2 (Fstart_No.x)
- End of measurement: InPosition signal at output X11B/3 (InPos)
- InPosition window: 0.01 mm
- Low-vibration Quick-Set mounting element

A stable, low-vibration mounting element is extremely important for achieving the times according to the graph.

Fig. 5



s: Traversing distance [mm]
t: Time from input of start signal to feedback "In Position" in an "In Position window" of 0.01 mm [ms]

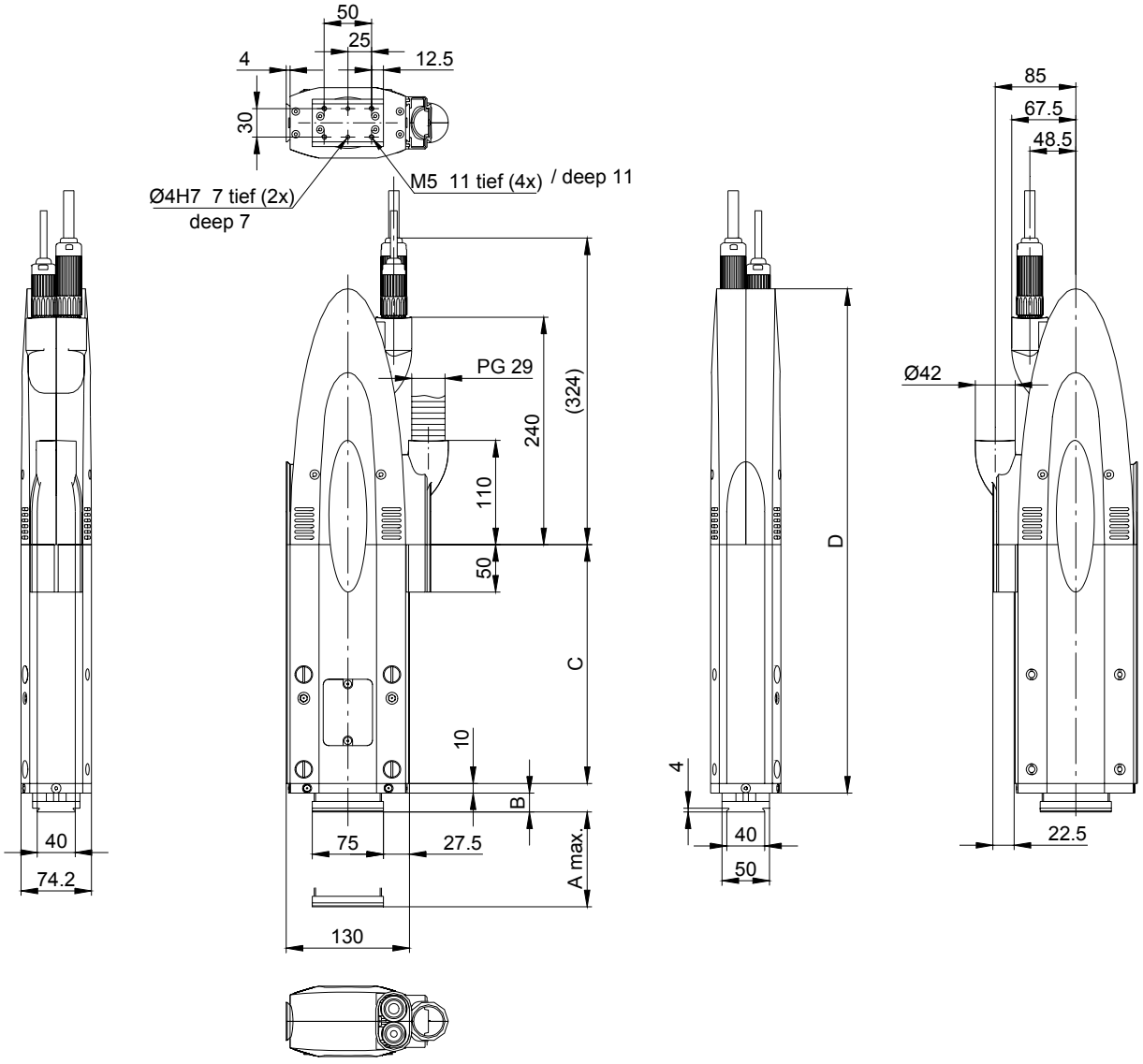
2.2 Servo vertical unit SVE-130

			SVE-130-100	SVE-130-200
Max. stroke		[mm]	100	200
Max. permissible mounting mass		[kg]	5	5
Max. stat. moment M_{0Xmax}	1)	[Nm]	30	30
Max. stat. moment M_{0Ymax}	1)	[Nm]	65	65
Max. stat. moment M_{0Zmax}	1)	[Nm]	15	15
Max. force F_{Zmax}	1)	[N]	120	120
Max. speed		[mm/s]	1000	1000
max. acceleration	2)	[m/s^2]	7.5	7.5
Own weight		[kg]	5.5	6.5
Drive			Highly dynamic synchronous servo motor with locking brake	
Rated motor power		[W]	130	
Enclosure protection for servo motor			IP64	
Transmitter system			Resolver	
Repeatability	3)	[mm]	+/- 0.01	
Reference position proximity switch			Integrated inductive proximity switch PNP	
Sound level		[dBA]	< 68	
Max. operating temperature of motor	4)	[°C]	52	
Ambient conditions: Temperature		[°C]	10 - 50	
Rel. humidity			5% ... 85% non-condensing	
Air purity			Normal workshop atmosphere	
Warranty period			2 years from date of delivery	
Installation position			Vertical	
Material			Aluminium, steel, plastic	

1) See load calculations
2) At max. permissible mounting mass
3) At constant motor temperature. Measured at max. load, max. speed and 100 successive strokes
4) At 20°C ambient temperature

2.2.1 Dimensioned drawing of SVE-130

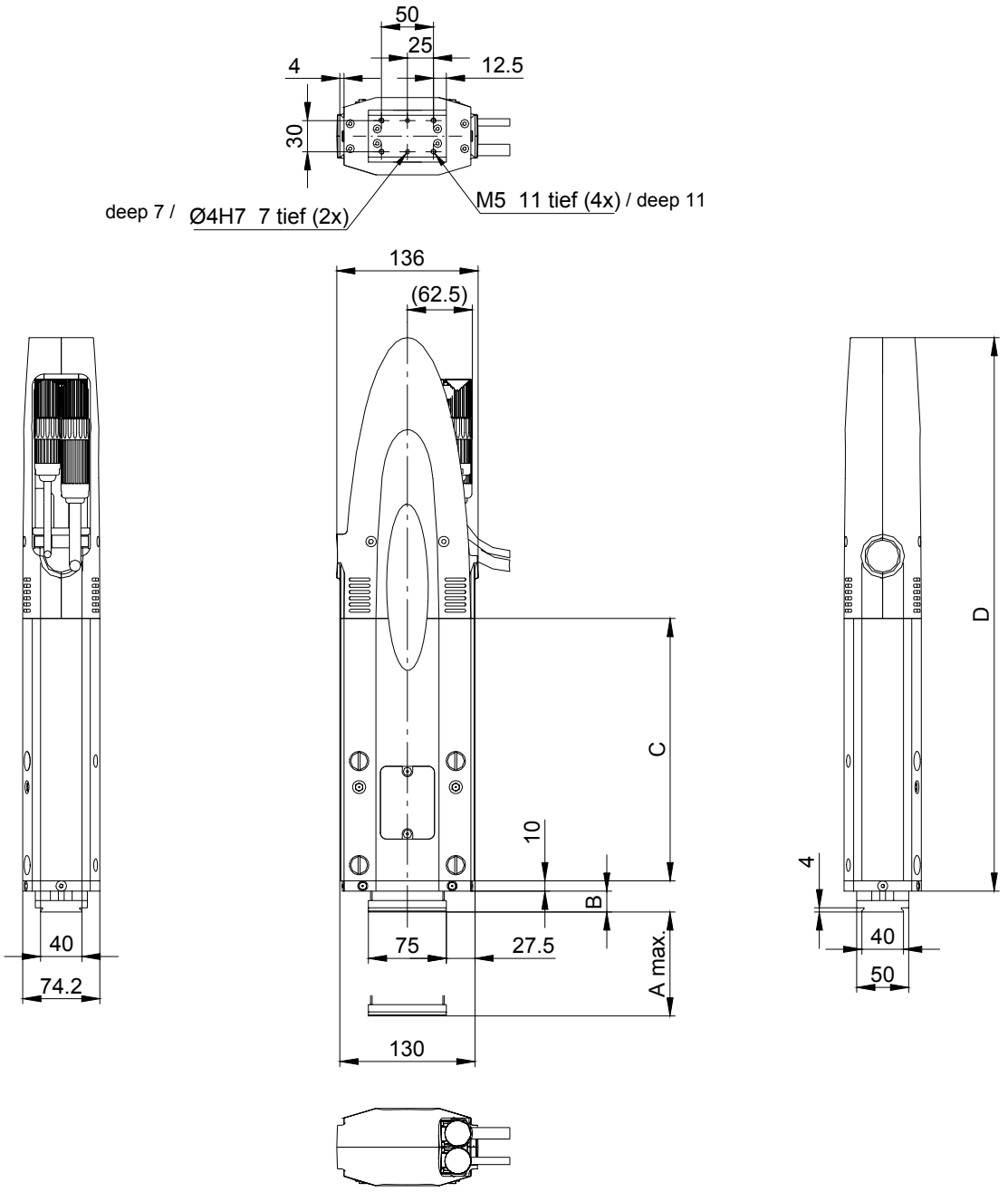
Fig. 6



	A max. [mm]	B [mm]	C [mm]	D [mm]
SVE-130-100	100	20 - 120	252	532
SVE-130-200	200	20 - 220	352	632

2.2.2 Dimensioned drawing of SVE-130-EK

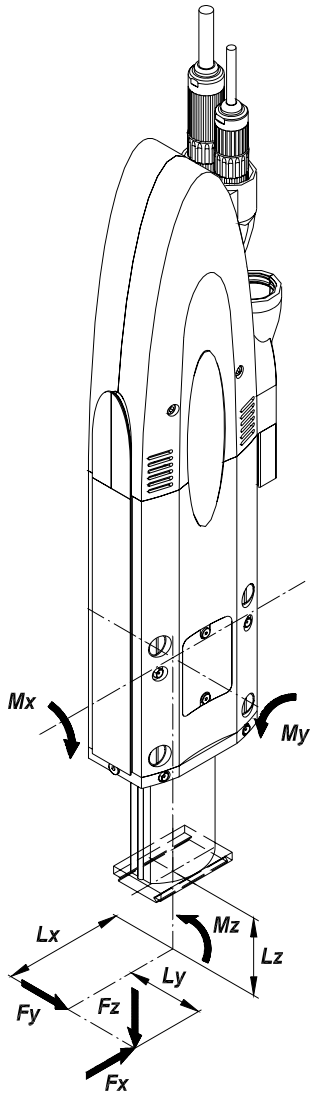
Fig. 7



	A max. [mm]	B [mm]	C [mm]	D [mm]
SVE-130-100-EK	100	20 - 120	252	532
SVE-130-200-EK	200	20 - 220	352	632

2.2.3 Load calculations for SVE

Fig. 8



a) Dynamic load

$$M_X = 0.001 \cdot m \cdot L_Y \cdot (g + a)$$
$$M_Y = 0.001 \cdot m \cdot L_X \cdot (g + a)$$

Combined dynamic load:

$$B = \frac{M_X}{10} + \frac{M_Y}{20} \leq 1$$

b) Static load

$$M_{0X} = 0.001 \cdot (F_Z \cdot L_Y + F_Y \cdot (L_Z + K_Z))$$
$$M_{0Y} = 0.001 \cdot (F_Z \cdot L_X + F_X \cdot (L_Z + K_Z))$$
$$M_{0Z} = 0.001 \cdot (F_X \cdot L_Y + F_Y \cdot L_X)$$

Combined static load:

$$B_0 = \frac{M_{0X}}{60} + \frac{M_{0Y}}{65} + \frac{M_{0Z}}{30} \leq 1$$

B, B_0:	Load factor: **Must not exceed the value 1!**
M_i, M_{0i}:	Existing moments [Nm]
M_{iper}, M_{0iper}:	Permissible moments [Nm] (see Table)
m:	Mounting mass [kg]
L_X, L_Y, L_Z:	Distance of moving mass from centre of gravity or force application distances [mm]
F_X, F_Y, F_Z:	Forces acting [N]
a:	Acceleration of the unit [m/s^2]
K_Z:	Constant according to Table [mm]

	K_Z [mm]	M_{Xper} [Nm]	M_{Yper} [Nm]	M_{0Xper} [Nm]	M_{0Yper} [Nm]	M_{0Zper} [Nm]
SVE-130-100	195	10	20	30	65	15
SVE-130-200	295	10	20	30	65	15

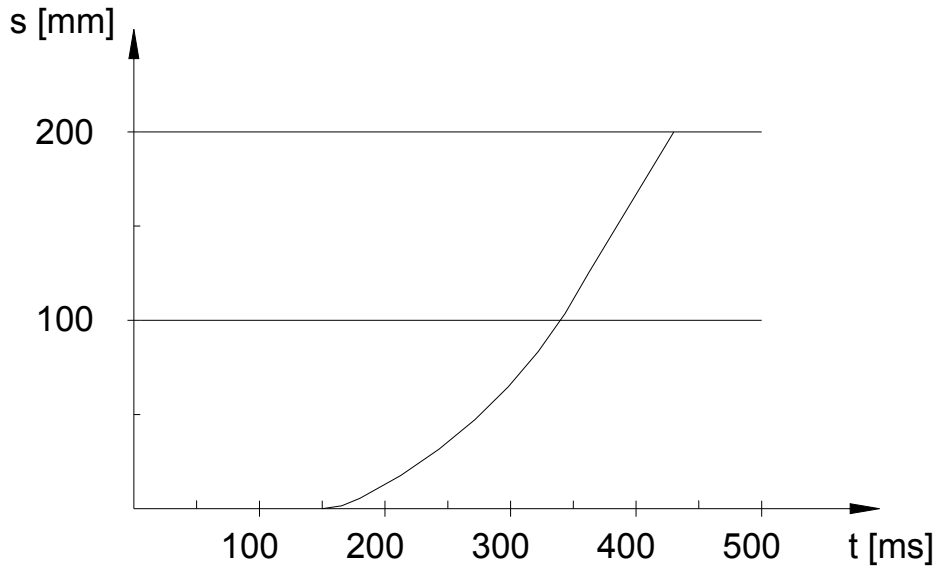
2.2.4 Traversing times of SVE-130

The traversing times were determined for an SVE-130-200 under the following conditions:

- Load: 5 kg
- Speed: 1000 mm/s
- Acceleration or deceleration: 7.5 m/s^2
- Beginning of measurement: Start signal at input X11B/2 (Fstart_No.x)
- End of measurement: InPosition signal at output X11B/3 (InPos)
- InPositions window: 0.01 mm
- Low-vibration Quick-Set mounting element

A stable, low-vibration mounting element is extremely important for achieving the times according to the graph.

Fig. 9



s: Traversing distance [mm]
t: Time from input of start signal to feedback "In Position" in an "In Position window" of 0.01 mm [ms]

3. Installation

3.1 Mechanical design

3.1.1 Design of the system

When designing the system, the following points must be taken into account:

- The servo horizontal units SHE-130 and servo vertical units SVE-130 must only be operated behind protective devices according to EN 292-2, Section 4.2.2.3.
- Ensure unrestricted ventilation of the motor and keep within the permitted ambient temperatures.
- Provide low-vibration Quick-Set construction.

3.1.2 Installation position and assembly

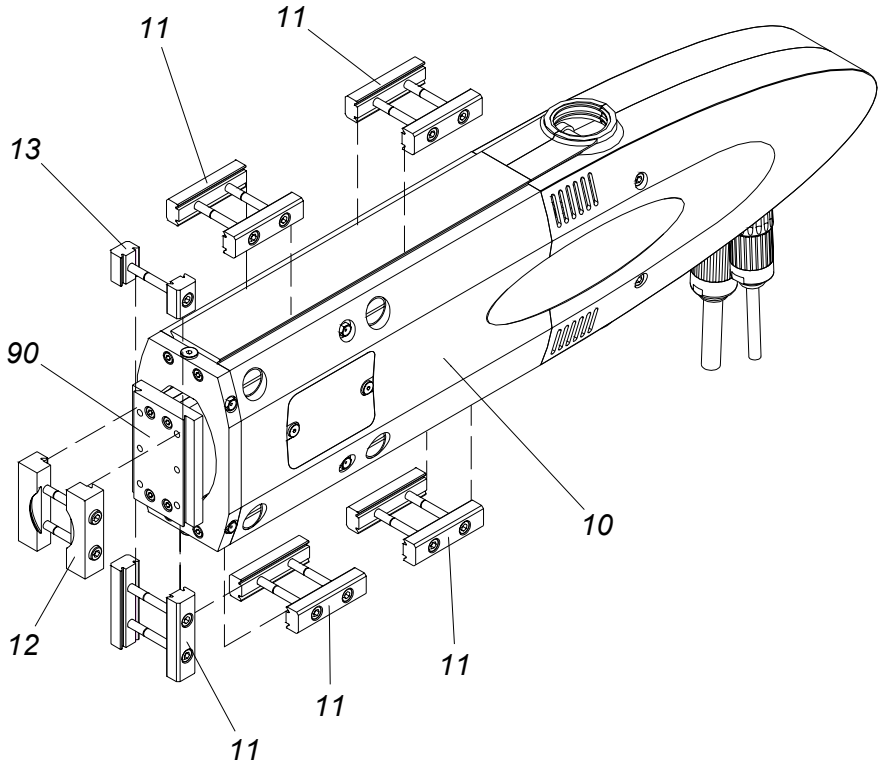
Tool required	Dimension	Use for:
Hexagon socket wrench	4 mm	All Quick-Set clamping elements

SHE-130:

The servo horizontal unit SHE-130 is installed horizontally so that the plug of the servo motor (670) points downwards. Fixing is implemented via the dovetails at the top or bottom of the housing (10) by means of at least two Quick-Set clamping elements SLL-55 (11).

The supplementary devices are mounted via the dovetail of the clamping plate (90) with the aid of a clamping element SLL-55 (11) or SLR-15 (12). For greater rigidity, it is advisable to use a clamping element SLL-55 (11) in combination with a clamping element SLL-20 (13) (utilization of the whole dovetail length on the clamping plate (90)).
Alternatively, the fixing thread and the positioning holes in the clamping plate (90) can be used (see dimensioned drawing, Fig. 3).

Fig. 10

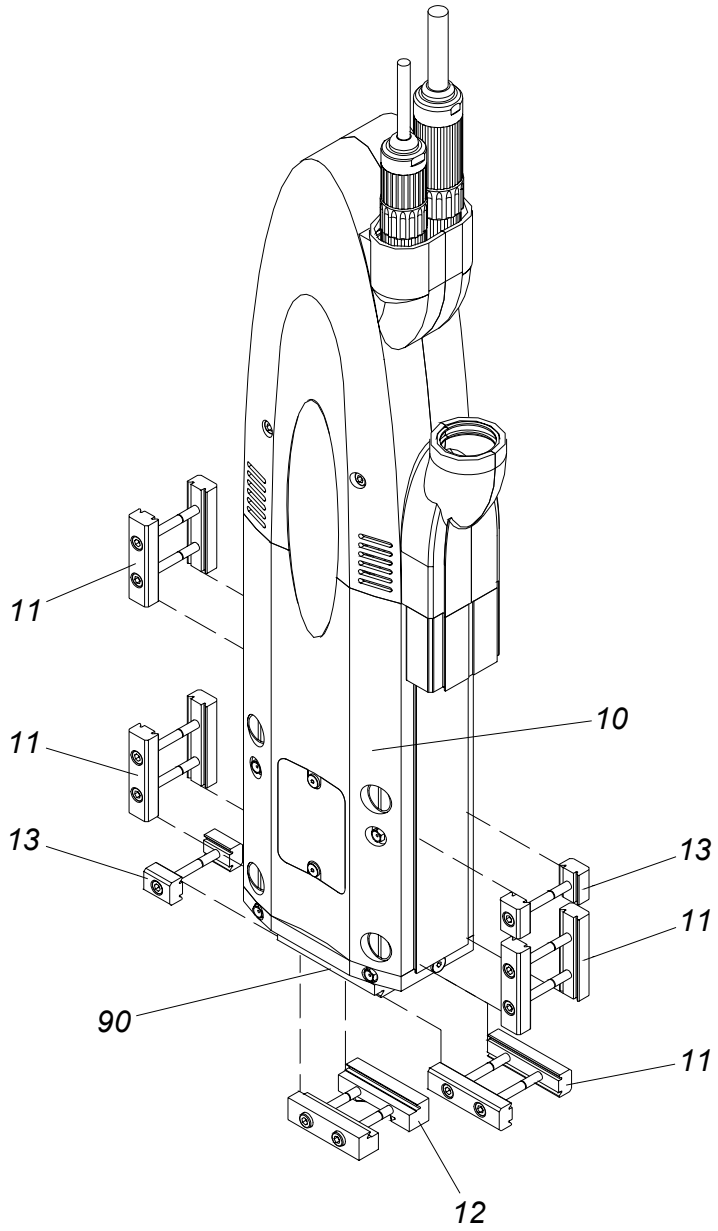


SVE-130:

The servo vertical unit SVE-130 is installed vertically. Fixing is implemented via the dovetails behind or in front of the housing (10) by means of Quick-Set clamping elements. Depending on the length of the available dovetail on the device or attachment to be installed, at least one clamping element SLL-55 (or SLL-55/22) (11) must be used in combination with a clamping element SLL-20 (or SLL-20/22) (13).

The supplementary devices are mounted via the dovetail of the clamping plate (90) with the aid of a clamping element SLL-55 (11) or SLR-15 (12). For greater rigidity, it is advisable to use a clamping element SLL-55 (11) in combination with a clamping element SLL-20 (13) (utilization of the whole dovetail length on the clamping plate (90)).
Alternatively, the fixing thread and the positioning holes in the clamping plate (90) can be used (see dimensioned drawing, Fig. 6).

Fig. 11



3.1.3 Combination of SHE-130 and SVE-130:

The combination of a servo horizontal unit SHE-130 with a servo vertical unit SVE-130 is implemented by means of an SLL-55/22 and of an SLL-20/22. The increased dovetail space due to the use of these clamping elements permits clean lead-through of the cables and hoses from supplementary devices between the two dovetails (Fig. 12).
For stabilizing the protective sleeve of the servo vertical unit SVE-130, it is advisable to fasten the protective sleeve to the cable plugs of the SVE-130 (e.g. by means of a cable tie) (Fig. 13).

Fig. 12

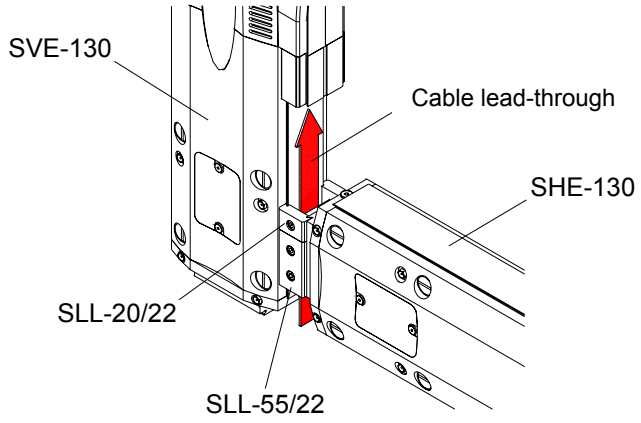
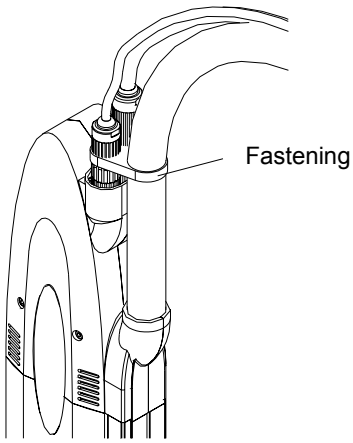


Fig. 13



3.2 Lead-through of cables and hoses of supplementary devices

SHE-130:

In the SHE-130, the cables and hoses of the supplementary devices are led by means of the protective sleeve through the upper sleeve opening of the hoods (230 and 240) into the device and out again together with the proximity switch cable (610) through the lower sleeve opening (Fig. 14). A protective sleeve which is fixed in the lower sleeve opening is also used for carrying the cables and hoses further.
The motor cable and resolver cable of the SHE-130 are led away along the lower protective sleeve.
The motor cable and resolver cable of an installed SVE-130 are led as described under SVE-130 and continue outside the hoods (230 and 240) in the SHE-130 (Fig. 15).

Fig. 14

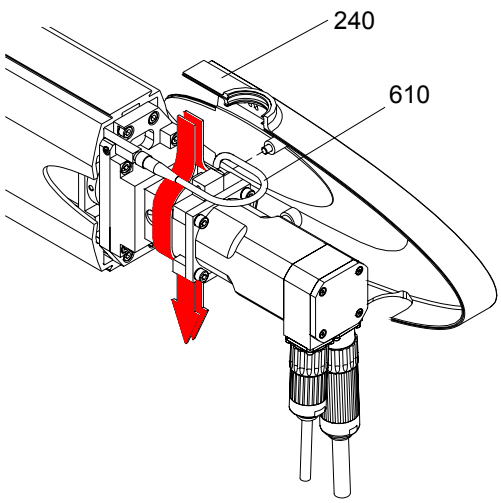
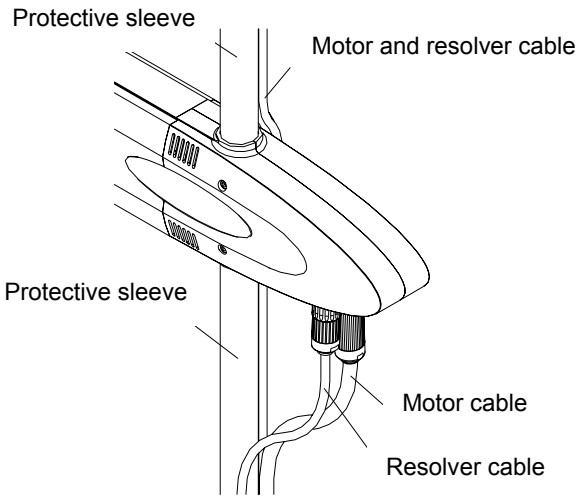
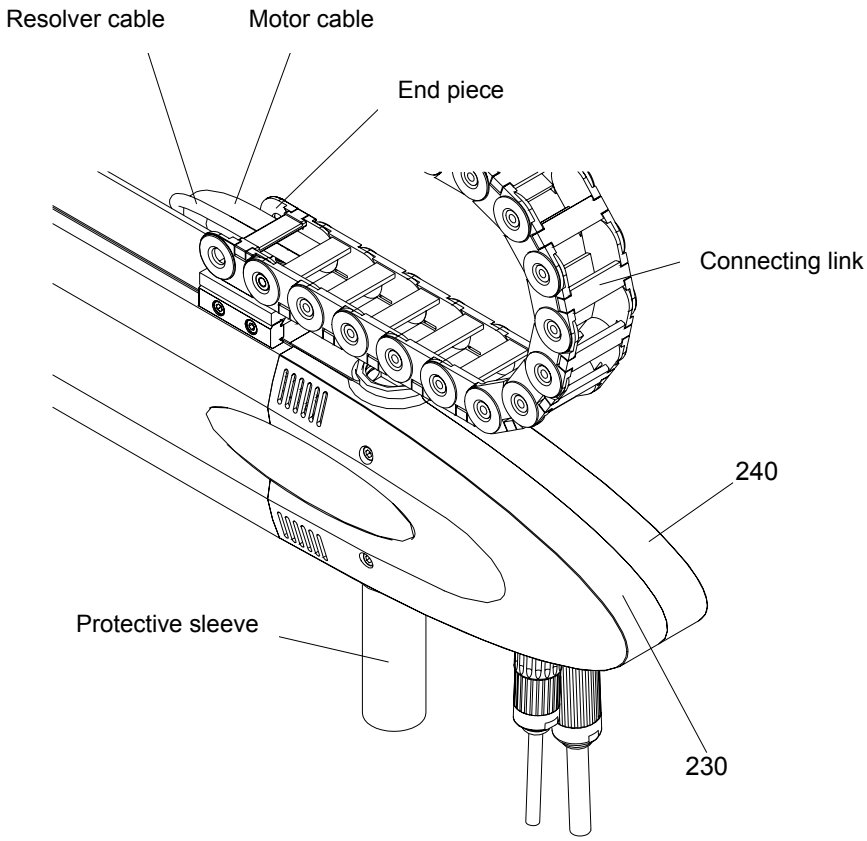


Fig. 15



When an energy conducting carrier is used, motor cable and motor resolver cable are led out of the energy conducting carrier according to Fig. 16 and are fastened to the end piece with a cable tie for strain relief. Additional cables and hoses can be laid in the same way as the motor cable and resolver cable or can be led through the SHE-130 into a protective sleeve by removing a connecting link on one of the energy conducting carrier links (in the region of the upper sleeve opening of the hoods (230 and 240)), according to Fig. 14.

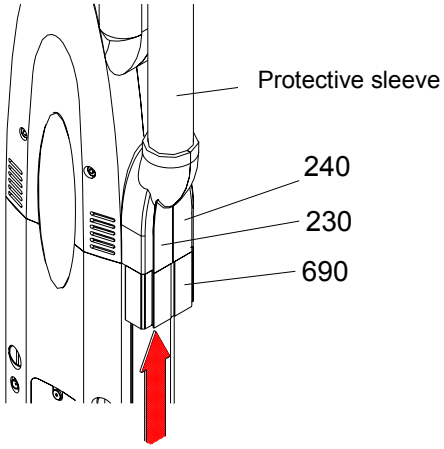
Fig. 16



SVE-130:

The cables and hoses of the supplementary devices are led into the device in the case of the SVE-130 through the opening in the hoods (230 and 240) and additionally covered with the snap-on cable cover (690) (Fig. 17). Together with the proximity switch cable (610), the cables and hoses are led through the sleeve opening into the protective sleeve and continue protected in this way.
The motor cable and resolver cable of the SVE-130 are led along the protective sleeve and are fixed to the protective sleeve at some points for stabilization (Fig. 13).

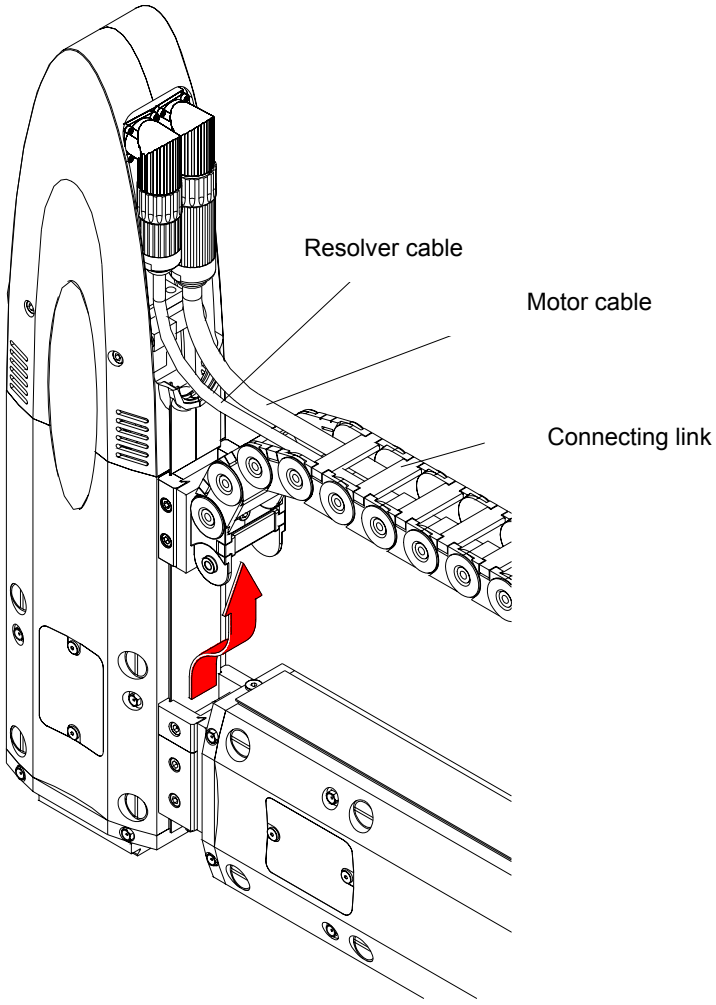
Fig. 17



SVE-130-EK:

The cables and hoses of the supplementary devices are led into the energy conducting carrier according to Fig. 18.
Motor and resolver cables and the proximity switch cable of the SVE-130-EK are led into the energy conducting carrier by removing one or more connecting links of the energy conducting carrier, as shown in Fig. 18.

Fig. 18



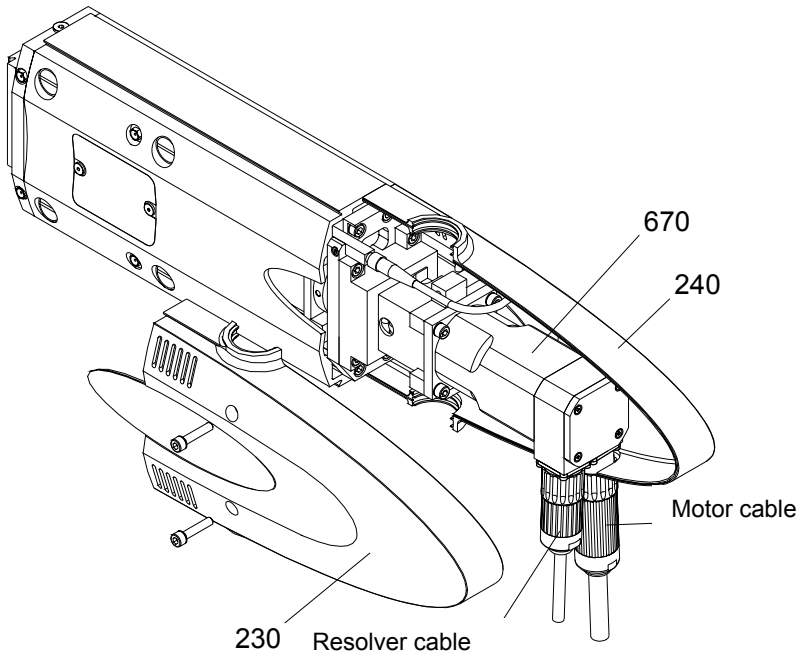
3.3 Connecting the motor cable and resolver cable

- **The servo amplifier must be disconnected from the supply voltage. Switch off the main switch or mains contactor.**
- **Ensure that no unauthorized switching-on of the supply voltage can occur.**
- **During operation, the surface of the motor can reach 100°C. Do not touch the motor until the temperature has dropped below 40°C (measure the surface temperature).**
- **Failure to observe these safety measures may result in death or serious personal injuries or material damage.**

The motor cables and resolver cables supplied are 5 m in length. Longer cables are available as options. The cables are preassembled with coded concentric plugs on the motor side.

For easier mounting of the cables on the servo motor (670) the hoods (230 and 240) can be removed by undoing the cap screws (570).

Fig. 19



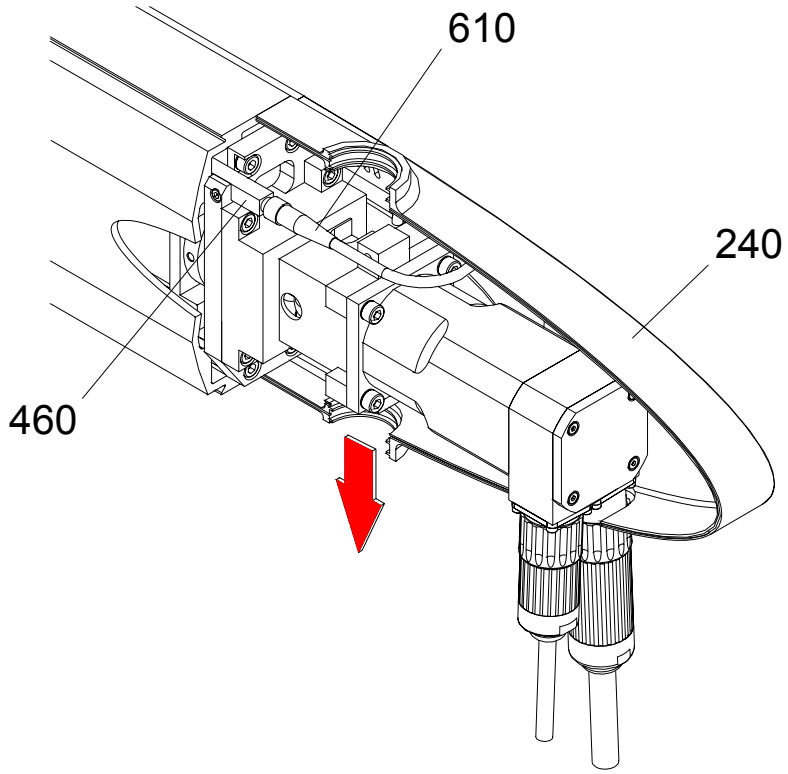
3.4 Connecting the inductive proximity switch

- **The servo amplifier must be disconnected from the voltage supply. Switch off the main switch or mains contactor.**
- **Ensure that no unauthorized switching-on of the supply voltage can occur.**
- **During operation, the surface of the motor can reach 100°C. Do not touch the motor until the temperature has dropped below 40°C (measure the surface temperature).**
- **Failure to observe these safety measures may result in death or serious personal injuries or material damage.**

The length of the proximity switch cable (610) supplied is 5 m. The cable is equipped with a screwable plug on the proximity switch side and is mounted on the proximity switch (460) on delivery.
The proximity switch cable (610) is led out through the lower opening (SHE-130) or the protective sleeve connection (SVE-130) of the hoods (230 and 240) and into a protective sleeve.

Note: Wiring according to User Manual for servo amplifier.

Fig. 20



4. Maintenance

4.1 Lubrication

Move servo unit to a position ≥ 50 mm and switch off voltage supply.

- **The servo amplifier must be disconnected from the voltage supply. Switch off the main switch or mains contactor.**
- **Ensure that no unauthorized switching-on of the voltage supply can occur.**
- **During operation, the surface of the motor can reach 100°C. Do not touch the motor until the temperature has dropped below 40°C (measure the surface temperature).**
- **Failure to observe these safety measures may result in death or serious personal injuries or material damage.**

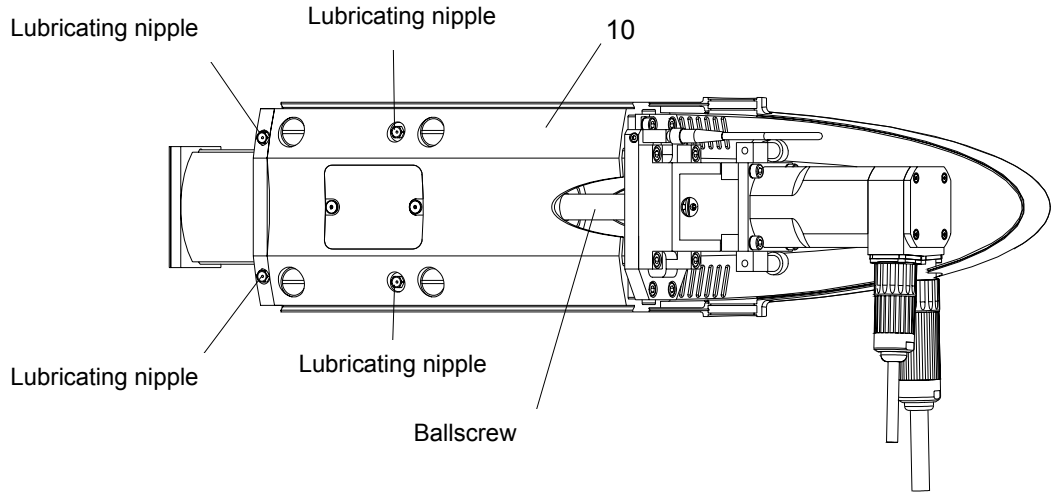
Use only **Klüber oil "Paraliq P460"** as a lubricant (Montech Art. No. 504721).

- Lubrication interval: 800 operating hours
- Lubrication points: 4 lubricating nipples and ballscrew (Fig. 21)

Lubrication of the ballscrew:

- Remove hood (230).
- Apply Paraliq P460 directly to the ballscrew (30) over the whole area of the elliptical hole in the housing (10).
- Mount hood (230).
- Connect supply voltage and switch on.
- Start reference traverse.

Fig. 21



- **Do not start servo units without mounted hoods (230 and 240)!**

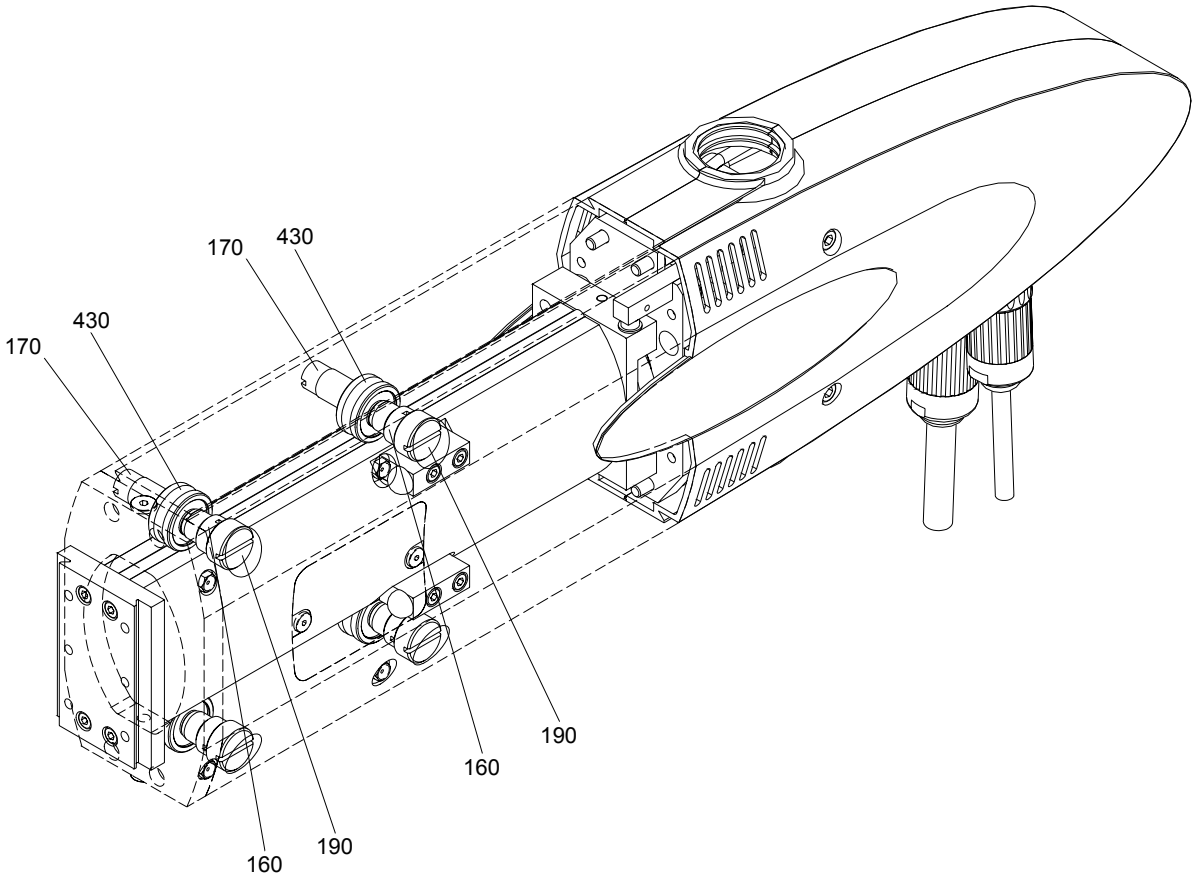
4.2 Setting the slide play

- **The servo amplifier must be disconnected from the voltage supply. Switch off the main switch or mains contactor.**
- **Ensure that no unauthorized switching-on of the supply voltage can occur.**
- **During operation, the surface of the motor can reach 100°C. Do not touch the motor after the temperature has dropped below 40°C (measure the surface temperature).**
- **Failure to observe these safety measures may result in death or serious personal injuries or material damage.**

Tool required	Dimension	Use for:
2 screwdrivers	No. 6	Items 190; 170

- Undo the two upper threaded journals (190) so that the tension nuts (170) can be easily turned with the eccentric shafts (160).
- By turning the tension nuts (170) clockwise, set the rollers (430) so that there is no play (no initial tension).
- Tighten the threaded journals (190) while holding the tension nuts (170) with a screwdriver to prevent the set position of the roller (430) from changing.

Fig. 22



4.3 Changing the inductive proximity switch (460)

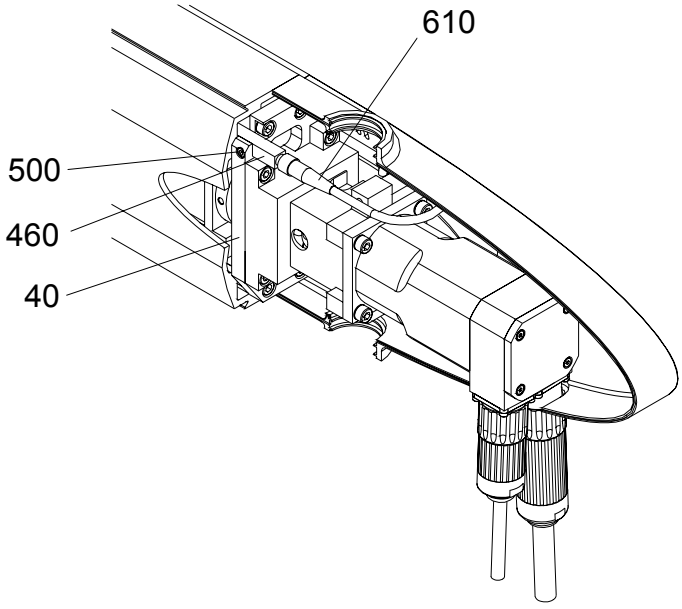
- **The servo amplifier must be disconnected from the voltage supply. Switch off the main switch or mains contactor.**
- **Ensure that no unauthorized switching-on of the supply voltage can occur.**
- **During operation, the surface of the motor can reach 100°C. Do not touch the motor until the temperature has dropped below 40°C (measure the surface temperature).**
- **Failure to observe these safety measures may result in death or serious personal injuries or material damage.**

Tool required	Dimension	Use for:
Hexagon socket wrench	2.5 mm	Item 500
	4 mm	Item 570

- Move hood (230) by undoing the cap screws (570).
- Disconnect cable (610) from proximity switch (460).
- Undo screw (500) and remove proximity switch (460).
- Mount the new proximity switch (460) on the housing flange (40) (use thread on output side of proximity switch (460) and mount proximity switch (460) so that it rests on the base of the groove).
- Mount cable (610) to proximity switch (460).
- Mount hood (230).
- The LED of the proximity switch (460) must light up when supply voltage is applied if the slide (20) is completely retracted. When this condition is fulfilled, the reference traverse can be implemented.

Note: Proximity switch PNP, switching distance 2 mm (also see Spare Parts List)

Fig. 23



4.4 Changing the slide and drive elements

Procedure:

Important: The following points must be implemented before repairs:

- Perform reference traverse.
- Switch off supply voltage.
- Remove servo unit from installation.

- **The servo amplifier must be disconnected from the voltage supply. Switch off main switch or mains contactor.**
- **Ensure that no unauthorized switching-on of the voltage supply can occur.**
- **During operation, the surface of the motor can reach 100°C. Do not touch the motor until the temperature has dropped below 40°C (measure the surface temperature).**
- **Failure to observe these safety measures may result in death or serious personal injuries or material damage.**

4.4.1 Changing the ballscrew (30) (Fig. 25)

Tool required	Dimension	Use for:
Fork spanner	13 mm	Item 30
Hook spanner	21 mm	Item 420
Hexagon socket wrench	2.5 mm	Items 500; 210
	3 mm	Items 540; 510
	4 mm	Items 570; 560; 550
Assembly gauge	Art. No. 49466	Orientation of the spindle

Procedure (Preparation and notes, page C23, must be consulted):

- Remove hoods (230 and 240) by unscrewing the cap screws (570).
- The slide (20) of the servo unit is in the zero position after the reference traverse (dimension x = 20 mm, Fig. 24). The threaded pins of the clutch (210) are visible in the lateral hole (A) and the gap (B) on the surface of the motor flange (50) (Fig. 26).
- Undo cap screw (500) and remove proximity switch (460) incl. cable (610).
- Undo both threaded pins in the clutch (210).
- Unscrew cap screws (560) and remove servo motor (670) incl. clutch (210).
- Unscrew cap screws (550a) and remove motor flange (50).
- Undo cap screws (550b) and pull away housing flange (40) **max. 80 mm** from the housing (10). **Important: Slide (20) must be completely retracted.**
- Undo cap screws (540) and withdraw assembled spindle (30) incl. housing flange (40) from the servo unit. **Important: The revolving nut with the joint (C) may not move from the spindle. Hold revolving nut with joint (C) and spindle so that the joint (C) with the revolving nut cannot move on the spindle. The revolving nut moves very easily and moves by itself with a small approach angle.**
- Secure joint (C) incl. revolving nut by applying cable ties around the spindle, on both sides of the revolving nut (width across flats between joint (C) and housing flange (40) must be accessible).
- Undo cap screws (510) and remove bearing cover (60).
- Undo slotted nut (420) (hold with fork spanner on flats of ballscrew (30)) and remove.
- Remove spacer sleeve (200).
- Push ballscrew (30) out of the self-aligning ball bearing (410) in the housing flange (40).
- Push self-aligning ball bearing (410) out of the housing flange (40) and replace.
- Push new ball screw (30) incl. joint into the self-aligning ball bearing (410) in the housing flange (40). **Important: Ensure beforehand that the revolving nut on the spindle has been secured by means of cable ties.**

No forces may act on the revolving nut of the spindle and on the joint.

- Push spacer sleeve (200) onto ball screw (30) and screw on slotted nut (420) and tighten. (Hold with fork spanner on flats of the ballscrew (30)).
- Mount bearing cover (60) and tighten cap screws (510) uniformly in a crosswise manner.
- Remove cable ties (for securing revolving nut).
- Move ballscrew (30) into slide (20). **Important: Hold revolving nut with joint (C) and spindle so that the joint (C) with the revolving nut cannot move on the spindle. The revolving nut moves very easily and may move by itself simply with a small angle of approach.**
- Screw joint (C) to slide (20) (note position of the joint: cap screw (D) must be on the operating side). **Important: Distance between joint and housing flange (40) is not more than 80 mm.**
- Push housing flange (40) onto housing (10) and screw in cap screws (550b) (do not tighten, note position of proximity switch clearance).
- Mount motor flange (50) (note position).
- Position slide (20) at dimension x = 20 mm (Fig. 24).
- Push assembly gauge (Art. No. 49466) onto the end of the ballscrew (30) and position by moving the housing flange (40) in the turned hole in the motor flange (50).
- Fasten assembly gauge by means of cap screws (560) to motor flange (50).
- Tighten cap screws (550b) to fasten the housing flange (40).
- Remove assembly gauge.
- Mount servo motor (670) incl. clutch (210). **Important: Note position of the threaded pin in the clutch (210).**
- Mount servo motor by means of cap screws (560) on motor flange (50).
- Tighten **both** threaded pins in the clutch (210) through the gaps in the motor flange (50). **Important: Before tightening, check the slide position (dimension x = 20 mm, Fig. 24).**
- Mount the proximity switch (460) incl. cable (610) on the housing flange (40) (use thread on cable side in proximity switch (460) and mount proximity switch (460) so that it rests on the bottom of the groove).

- Lubricate the ballscrew (30) according to the section "Lubrication".
- Mount hoods (230 and 240) (lead cable (610) out through appropriate opening (see section "Connecting the inductive proximity switch") and lead through any cable and hoses (see section "Leading through cables and hoses from supplementary devices)).
- Check the reference positions.

Fig. 24

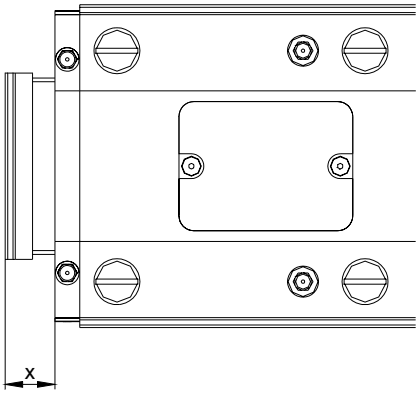
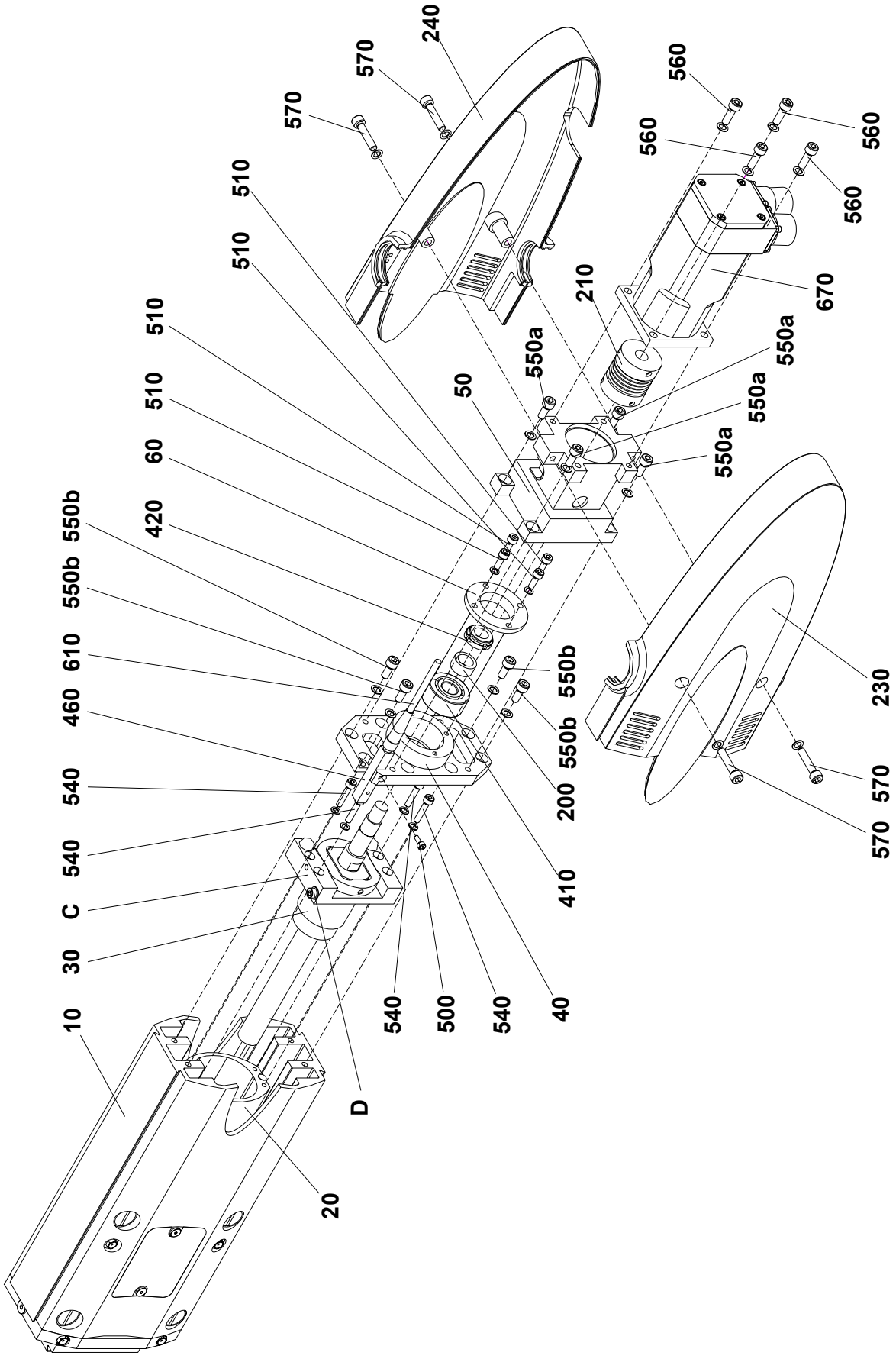


Fig. 25


240
570
570
560
560
560
560
510
510
670
210
510
550a
550a
550a
550a
50
510
60
420
550b
550b
610
460
540
540
C
30
10
20
D
540
500
540
40
410
200
550b
550b
230
570
570

4.4.2 Changing the clutch (210, Fig. 26)

Tool required	Dimension	Use for:
Hexagon socket wrench	2.5 mm	Item 210
	4 mm	Items 570; 560

Procedure (Preparations and notes, page C23, must be consulted):

- Remove hoods (230 and 240) by unscrewing the cap screws (570).
- After the reference traverse, the slide (20) of the servo unit is in the zero position (dimension x = 20 mm, Fig. 24). The threaded pins of the clutch (210) are visible in the lateral hole (A) and the gap (B) at the top of the motor flange (50).
- Undo both threaded pins in the clutch (210).
- Unscrew cap screws (560) and remove servo motor (670) incl. clutch (210).
- **Mark position of the threaded pins in the clutch (210) on the servo motor (670).**
- Undo both threaded pins in the clutch (210) on the motor side and remove clutch (210). **Important: In the servo motor (670) without a brake, ensure that the motor shaft is not turned.**
- Push new clutch (210) onto motor shaft. **Before pushing on**, align the clutch with the markings (no rotation of the motor shaft). Distance between motor and clutch: 3 mm (Fig. 27).
- Tighten both threaded pins in the clutch (210) on the motor side.
- Mount servo motor (670) incl. clutch (210) on motor flange (50) (note position of servo motor (670) and clutch (210); slide (20) must be in the zero position (dimension x = 20 mm, Fig. 24)).
- Tighten both threaded pins in the clutch (210) through the gaps (A and B) in the motor flange (50).
- Mount hoods (230 and 240) (lead cable (610) through appropriate opening (see section "Connecting the inductive proximity switch") and lead through any cables and hoses (see section "Leading through cables and hoses from supplementary devices")).
- Check the reference positions.

Fig. 26

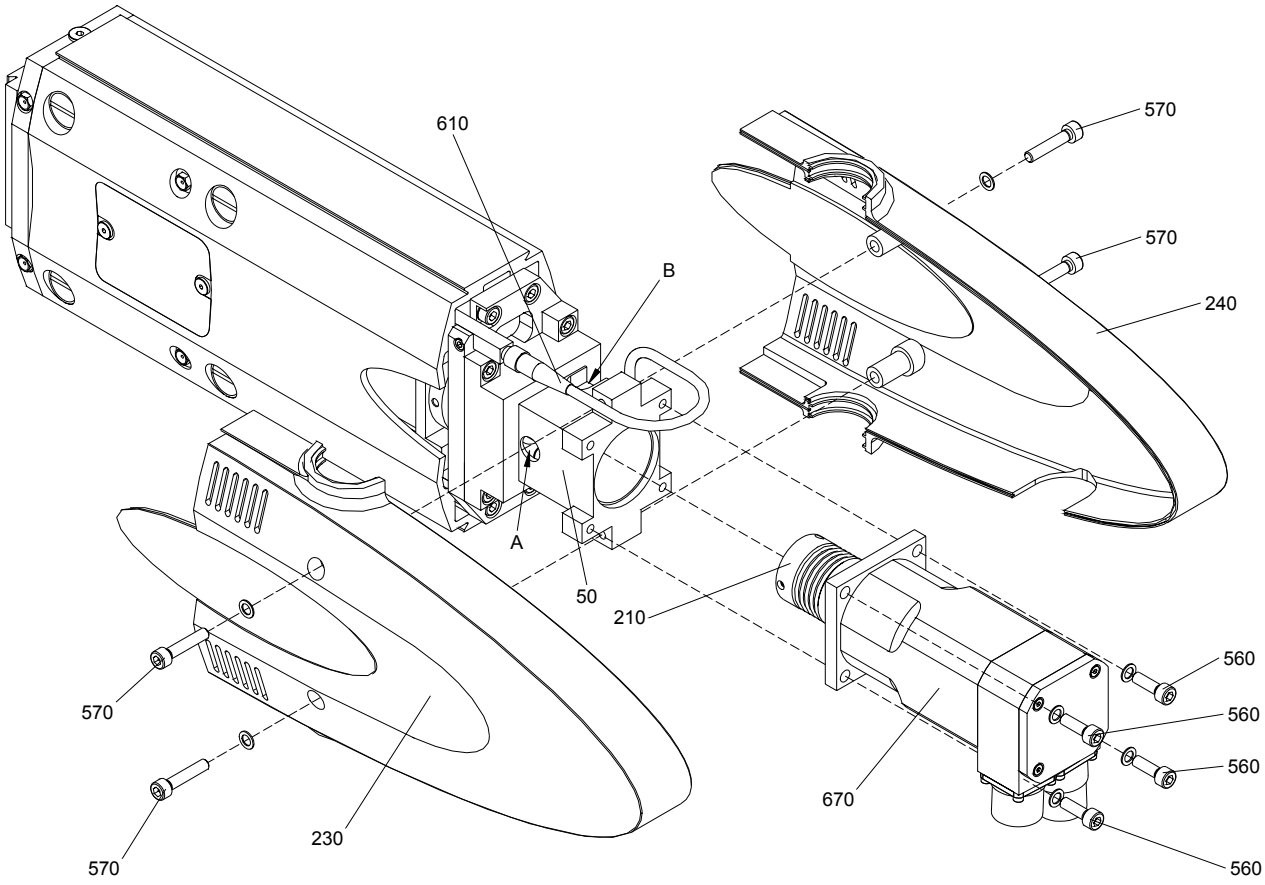
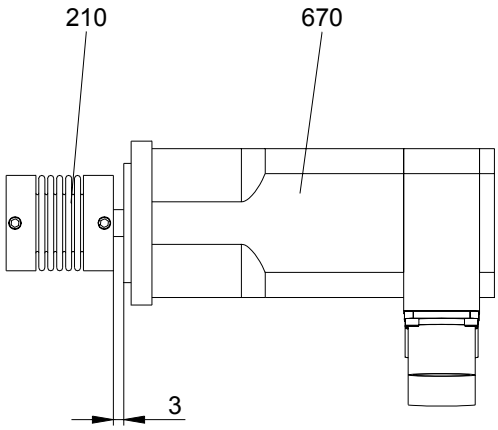

610
570
570
240
B
A
50
210
560
560
560
560
570
570
230
670

Fig. 27


210
670
3

4.4.3 Changing the rollers (430) and shafts (80) (Fig. 28)

The shafts (80) must always be changed together with the associated rollers (430).

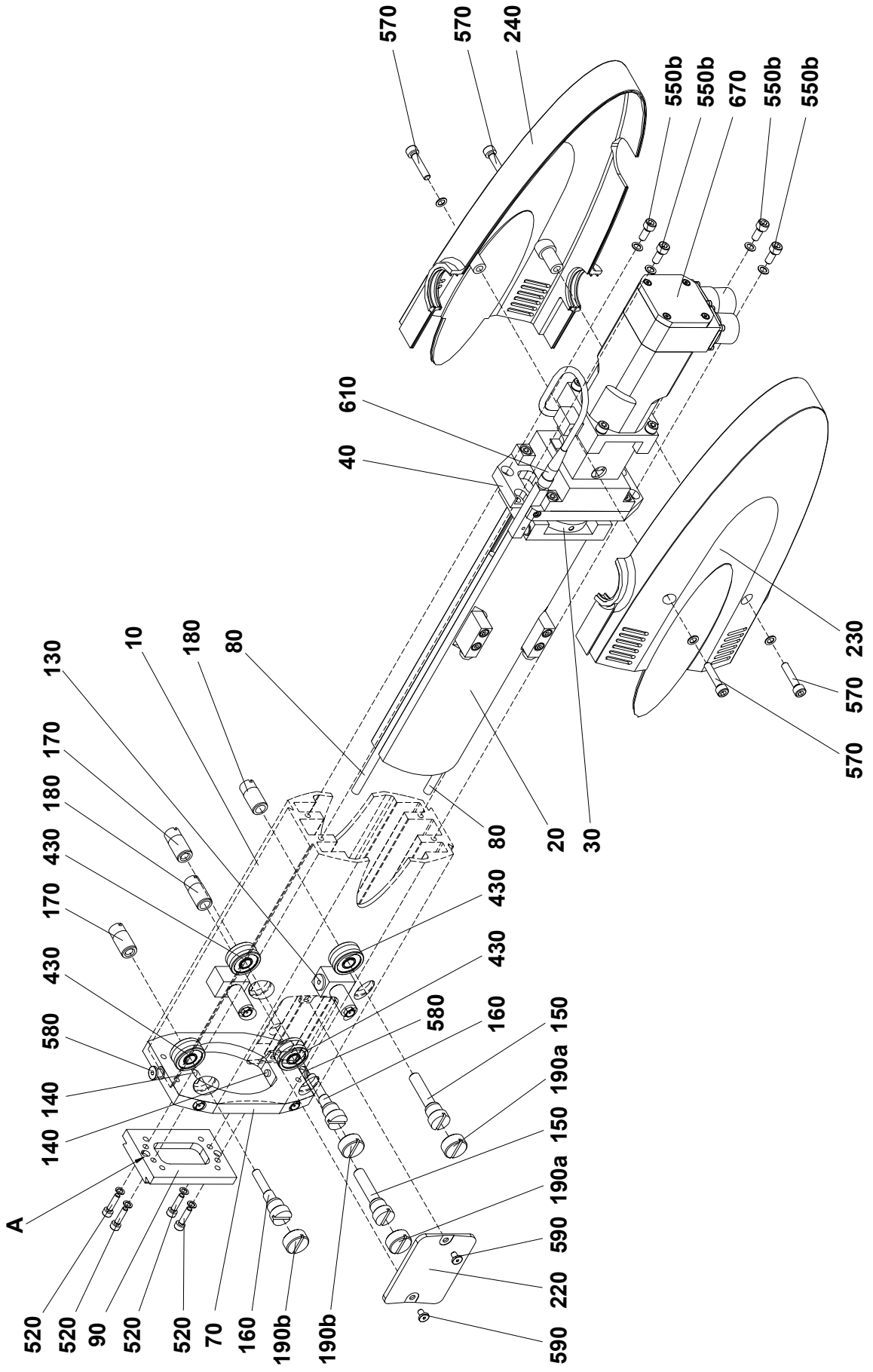
Tool required	Dimension	Use for:
Hexagon socket wrench	2 mm	Item 590
	3 mm	Items 520; 580
	4 mm	Items 570; 550
2 screwdrivers	No. 6	Items 190; 150; 160; 170; 180

Procedure (Preparations and notes, page C23, must be consulted).

- Remove hoods (230 and 240) by unscrewing the cap screws (570).
- Remove proximity switch cable (610).
- Remove clamping plate (90) by undoing the cap screws (520).
- Unscrew cap screws (580) in the end plate (70) by 5 – 6 mm each.
- Undo cap screws (550b) and pull housing flange (40) incl. servo motor (670), ballscrew (30) and slide (20) out of the housing (10) (hold servo motor (670) and slide (20)).
- Push felt wick (140) back into end plate (70).
- Withdraw shaft (80) from the grooves in the slide (20) and replace.
- Remove cover (220) from housing (10) by undoing the cap screws (590).
- Unscrew threaded journal (190a).
- Undo tension nuts (180) and remove.
- Remove rollers (430) by pushing out the concentric shafts (150).
- Insert new rollers (430) and push in concentric shafts (150).
- Tighten tension nuts (180) (hold the concentric shafts (150)).
- Screw in threaded journal (190a) and tighten.
- Unscrew threaded journal (190b).
- Undo tension nuts (170) and remove.
- Remove rollers (430) by pushing out the eccentric shafts (160).
- Insert new rollers (430) and push in eccentric shafts (160).
- Tighten tension units (170) (hold the eccentric shafts (160)).
- Screw in threaded journal (190b) (tighten only lightly).
- Set maximum distances between the upper and lower rollers (430) by turning the tension nuts (170).

- Push slide (20) incl. ballscrew (30), housing flange (40) and servo motor (670) into the housing (10) while holding the servo motor (670) and slide (20) and position the lower shaft (80) relative to the tightened rollers (430) (note felt (130) in the case of the rear rollers (430)). **Important: Note position of slide (20), housing flange (40) and servo motor (670).**
- Screw in cap screws (550b) (screw in only lightly, do not tighten).
- By turning the tension nut (170) clockwise, set the rollers (430) without any play (without initial tension).
- Tighten threaded journal (190b) while holding the tension nut (170) with a screwdriver so that the set position of the roller (430) does not change.
- Tighten cap screws (550b) (slide (20) fully retracted).
- Mount cover (220).
- Screw in cap screws (550) fully (felt wick (140) must touch the shafts (80)).
- Mount clamping plate (90) (note position: slot A on the side of the eccentric shafts (160)).
- Mount proximity switch cable (610).
- Mount hoods (230 and 240) (possibly after mounting in the installation (-> cable lead-through)).
- Before putting into operation again, relubricate according to section "Lubrication".
- Check the reference positions.

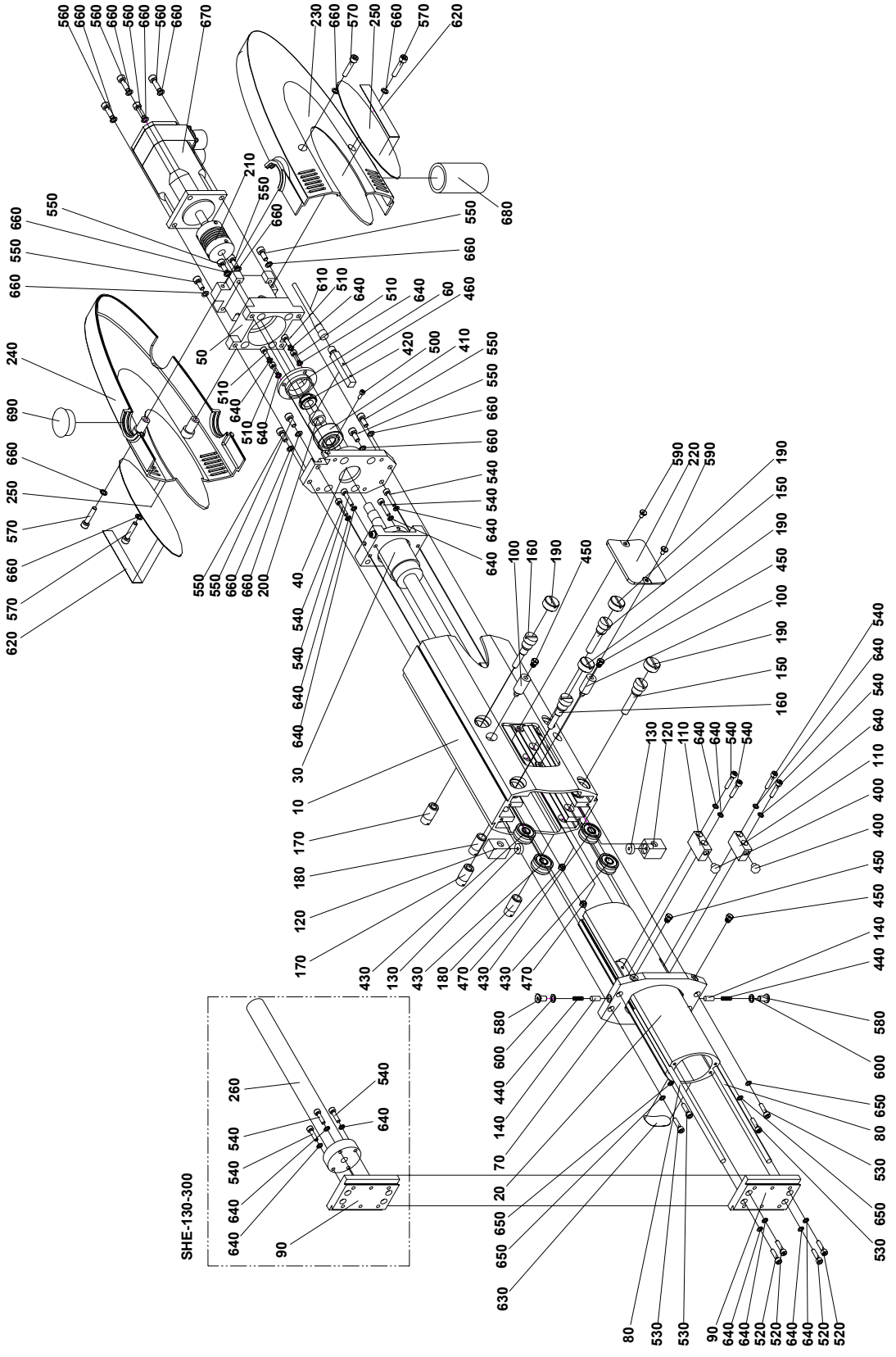
Fig. 28


570
570
240
550b
550b
670
550b
550b
610
40
230
570
570
130
10
180
80
170
180
430
170
430
580
140
140
A
80
20
30
430
430
580
160
150
190a
150
190a
590
220
590
520
520
90
520
520
70
160
190b
190b

5. Spare parts

5.1 Servo horizontal unit SHE-130

Fig. 29



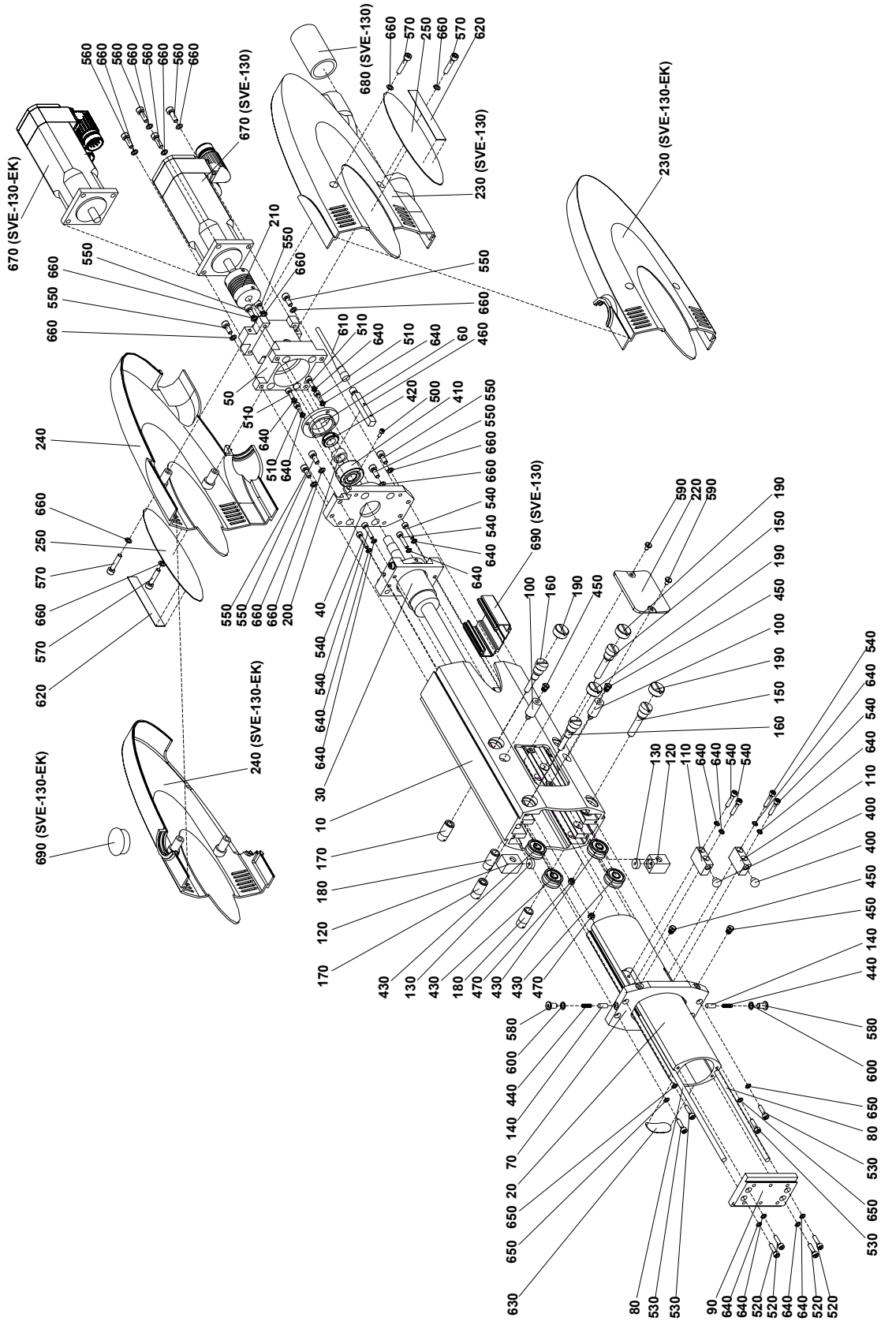
Spare parts list for SHE-130 (Fig. 29)

Item	Designation	Item number				Supplier	Material
	SHE-130-	-100	-200	-300	Stroke-independent		
10	Housing	49244	49376	49377		Montech AG	Aluminium
20	Slide	49245	49378	49379		Montech AG	Aluminium
30	Spindle assembled	49467	49468	49469		Montech AG	Various
40	Housing flange				49218	Montech AG	Aluminium
50	Motor flange				49219	Montech AG	Aluminium
60	Bearing cover				49220	Montech AG	Aluminium
70	End plate				49211	Montech AG	Aluminium
80	Shaft	49388	49389	49390		Montech AG	Steel
90	Clamping plate				49217	Montech AG	Aluminium
100	Lubricating tube				49212	Montech AG	Aluminium
110	Buffer holder				49213	Montech AG	Aluminium
120	Felt holder				49221	Montech AG	POM
130	Felt				49222	Montech AG	Wool felt
140	Felt wick				40921	Montech AG	Wool felt
150	Concentric shaft				49223	Montech AG	Steel
160	Eccentric shaft				49224	Montech AG	Steel
170	Tension nut				49225	Montech AG	Steel
180	Tension nut				49226	Montech AG	Steel
190	Threaded journal				49227	Montech AG	Steel
200	Spacer sleeve				49228	Montech AG	Steel
210	Clutch				506919	Montech AG	Various
220	Cover				50027	Montech AG	Painted ABS
230	Hood right				49906	Montech AG	Painted ABS
240	Hood left				49907	Montech AG	Painted ABS
250	Ellipse				49360	Montech AG	PS
260	Supporting tube	-	-	51228		Montech AG	Steel / POM
400	Plug-in buffer				506160	Maag Technik AG	NR
410	Self-aligning ball bearing 2201 2RS				503611		Steel
420	Slotted nut M12x1 BN 1235				505245	Bossard AG	Steel, PA
430	Roller				503663	INA	Steel
440	Pressure spring				504119	Kubo Tech AG	Steel
450	Lubricating nipple				504554	Hausammann AG	Brass
460	Proximity switch PNP				508847	Contrinex	Various
470	Set nut BN 201 M4 h1=1.8				502615	Bossard AG	Steel
500	Socket head cap screw ISO 4762 M3x8-8.8				501603		Blackened steel
510	Socket head cap screw ISO 4762 M4x12-8.8				501620		Blackened steel
520	Socket head cap screw ISO 4762 M4x16-8.8				501622		Blackened steel
530	Socket head cap screw ISO 4762 M4x16-A4				505328		Stainless steel
540	Socket head cap screw ISO 4762 M4x20-8.8				501624		Blackened steel
550	Socket head cap screw ISO 4762 M5x14-8.8				501639		Blackened steel
560	Socket head cap screw ISO 4762 M5x18-8.8				501641		Blackened steel
570	Socket head cap screw ISO 4762 M5x25-A4				505192		Stainless steel
580	Cap screw BN 1206 M6x10-10.9				506798	Bossard AG	Nickel-plated steel

Item	Designation	Item number				Supplier	Material
	SHE-130-	-100	-200	-300	Stroke-independent		
590	Cap screw BN 1206 M4x6-10.9				506799	Bossard AG	Nickel-plated steel
600	Screw seal				506185	Angst+Pfister AG	Steel, PUR
610	Cable				504610	Montech AG	PUR
620	Montech logo				41176	Montech AG	PVC
630	Type plate				41620	Montech AG	Metallized polyester
640	Ribbed washer M4				502364	Bossard AG	Blackened steel
650	Ribbed washer M4				502606	Bossard AG	Galvanized steel
660	Ribbed washer M5				502365	Bossard AG	Blackened steel
670	Servo motor				506784	Kollmorgen Seidel	Various
680	Protective sleeve				503693	PMA Elektro AG	PA
690	Cap				504784	Maag Technik AG	PA

5.2 Servo vertical unit SVE-130, SVE-130-EK

Fig. 30



Spare parts list for SVE-130, SVE-130-EK (Fig. 30)

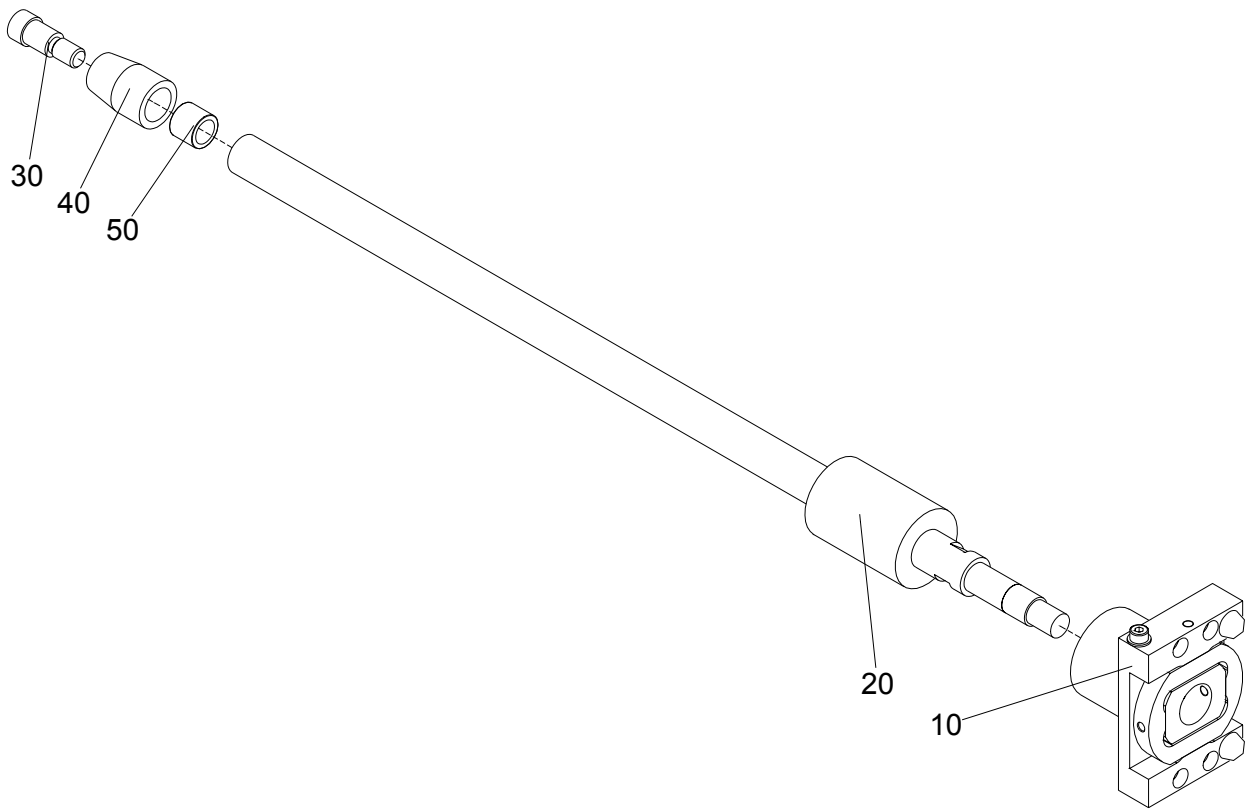
Item	Designation	Item number			Supplier	Material
	SVE-130 / SVE-130-EK	-100	-200	Stroke-independent		
10	Housing	49244	49376		Montech AG	Aluminium
20	Slide	49245	49378		Montech AG	Aluminium
30	Spindle assembled	49467	49468		Montech AG	Various
40	Housing flange			49218	Montech AG	Aluminium
50	Motor flange			49219	Montech AG	Aluminium
60	Bearing cover			49220	Montech AG	Aluminium
70	End plate			49211	Montech AG	Aluminium
80	Shaft	49388	49389		Montech AG	Steel
90	Clamping plate			49217	Montech AG	Aluminium
100	Lubricating tube			49212	Montech AG	Aluminium
110	Buffer holder			49213	Montech AG	Aluminium
120	Felt holder			49221	Montech AG	POM
130	Felt			49222	Montech AG	Wool felt
140	Felt wick			40921	Montech AG	Wool felt
150	Concentric shaft			49223	Montech AG	Steel
160	Eccentric shaft			49224	Montech AG	Steel
170	Tension nut			49225	Montech AG	Steel
180	Tension nut			49226	Montech AG	Steel
190	Threaded journal			49227	Montech AG	Steel
200	Spacer sleeve			49228	Montech AG	Steel
210	Clutch			506919	Montech AG	Various
220	Cover			50027	Montech AG	Painted ABS
230	Hood right SVE-130			49908	Montech AG	Painted ABS
	Hood right SVE-130-EK			49592	Montech AG	Painted ABS
240	Hood left SVE-130			49909	Montech AG	Painted ABS
	Hood left SVE-130-EK			49593	Montech AG	Painted ABS
250	Ellipse			49360	Montech AG	PS
400	Plug-in buffer			506160	Maag Technik AG	NR
410	Self-aligning ball bearing 2201 2RS			503611		Steel
420	Slotted nut M12x1 BN 1235			505245	Bossard AG	Steel, PA
430	Roller			503663	INA	Steel
440	Pressure spring			504119	Kubo Tech AG	Steel
450	Lubricating nipple			504554	Hausammann AG	Brass
460	Proximity switch PNP			508847	Contrinex	Various
470	Set nut BN 201 M4 h1=1.8			502615	Bossard AG	Steel
500	Socket head cap screw ISO 4762 M3x8-8.8			501603		Blackened steel
510	Socket head cap screw ISO 4762 M4x12-8.8			501620		Blackened steel
520	Socket head cap screw ISO 4762 M4x16-8.8			501622		Blackened steel
530	Socket head cap screw ISO 4762 M4x16-A4			505328		Stainless steel
540	Socket head cap screw ISO 4762 M4x20-8.8			501624		Blackened steel
550	Socket head cap screw ISO 4762 M5x14-8.8			501639		Blackened steel
560	Socket head cap screw ISO 4762 M5x18-8.8			501641		Blackened steel
570	Socket head cap screw ISO 4762 M5x25-A4			505192		Stainless steel

Item	Designation	Item number			Supplier	Material
	SVE-130 / SVE-130-EK	-100	-200	Stroke-independent		
580	Cap screw BN 1206 M6x10-10.9			506798	Bossard AG	Nickel-plated steel
590	Cap screw BN 1206 M4x6-10.9			506799	Bossard AG	Nickel-plated steel
600	Screw seal			506185	Angst+Pfister AG	Steel, PUR
610	Cable			504610	Montech AG	PUR
620	Montech logo			41176	Montech AG	PVC
630	Type plate			41620	Montech AG	Metallized polyes-ter
640	Ribbed washer M4			502364	Bossard AG	Blackened steel
650	Ribbed washer M4			502606	Bossard AG	Galvanized steel
660	Ribbed washer M5			502365	Bossard AG	Blackened steel
670	Servo motor SVE-130			506772	Kollmorgen Seidel	Various
	Servo motor SVE-130-EK			507035	Kollmorgen Seidel	Various
680	Protective sleeve (SVE-130 only)			503693	PMA Elektro AG	PA
690	Cable cover SVE-130			49543	Montech AG	Aluminium
	Cap SVE-130-EK			504784	Maag Technik AG	PA

5.3 Spindle assembled

Item	Designation	Item number				Supplier	Material
	SHE-130 / SVE-130	-100	-200	-300	Stroke-independent		
	Spindle assembled	**49467**	**49468**	**49469**			
10	Joint assembled				49475	Montech AG	Various
20	Ballscrew	49385	49386	49387		Montech AG	Various
30	Adjustment screw	-	-	51227		Montech AG	Steel
40	Centering sleeve	-	-	50393		Montech AG	POM
50	Needle roller bearing without inner ring HK1012	-	-	507948			Steel

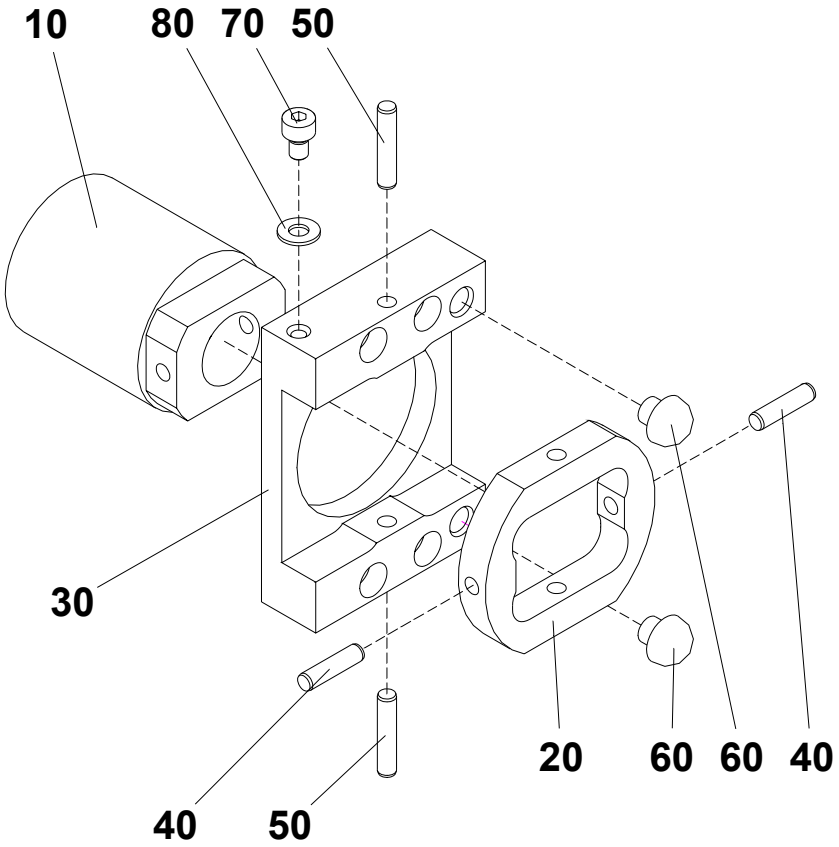
Fig. 31



5.4 Joint assembled

Item	Designation	Item No.	Supplier	Material
	Joint assembled	49475		
10	Sleeve	49216	Montech AG	Aluminium
20	Joint ring	49214	Montech AG	Bronze
30	Flange	49215	Montech AG	Aluminium
40	Straight pin DIN 6325 ø4h6x16	502036		Steel
50	Straight pin DIN 6325 ø4h6x20	502038		Steel
60	Plug-in buffer	506160	Maag Technik AG	NR
70	Socket head cap screw ISO 4762 M4x6-8.8	501617		Steel
80	U-washer ISO 7092 ø4.3/8x0.5	502569		Steel

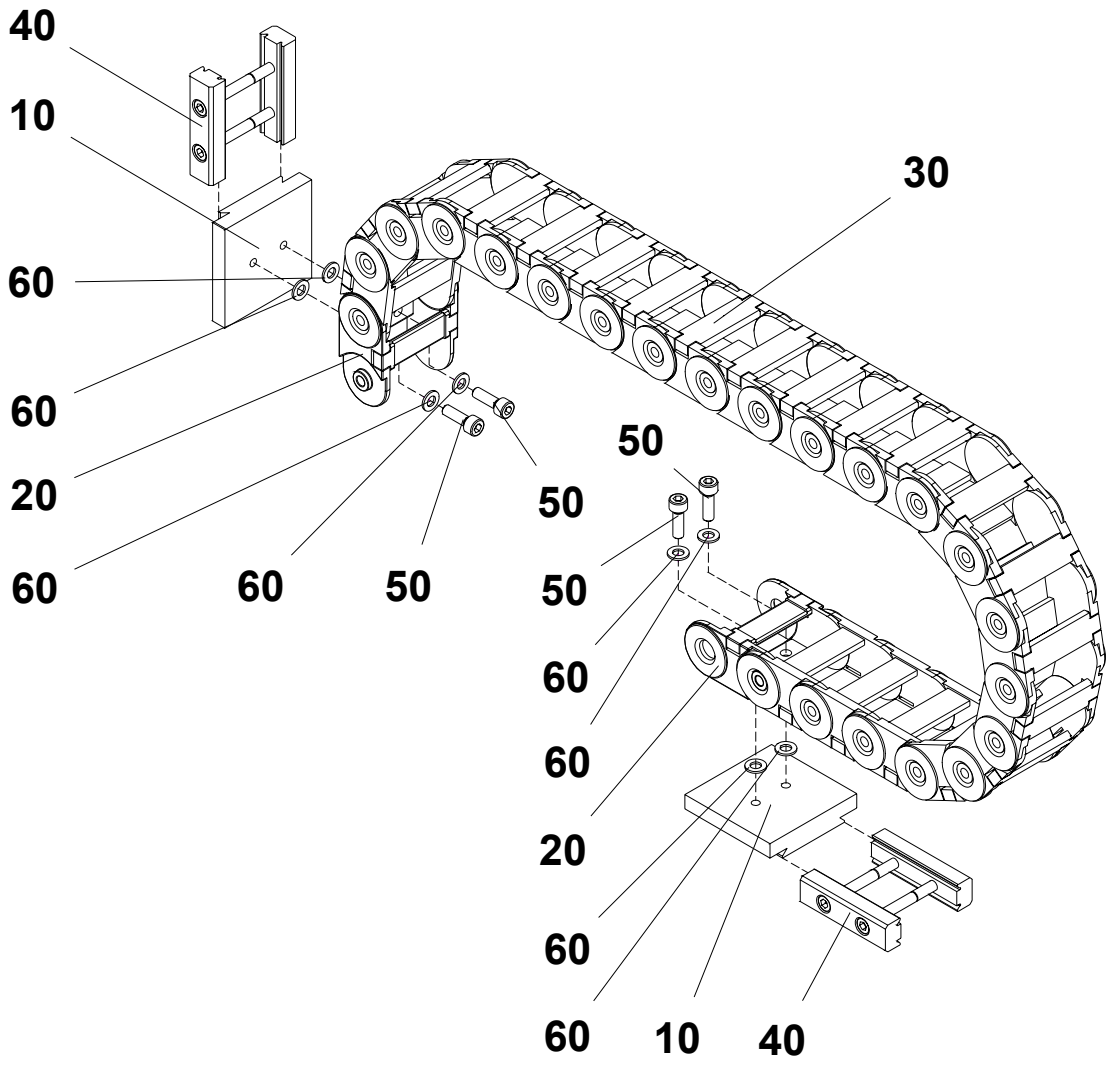
Fig. 32



5.5 Energy conducting carrier complete

Item	Designation	Item No.	Supplier	Material
	Energy conducting carrier complete	49901; 49902; 49903		
10	Adapter, straight	49899	Montech AG	Aluminium
20	Driver connection EK	48994	Montech AG	PA
30	Energy conducting carrier link 0345.030.038.075	507037	Kabelschlepp	PA
40	Clamping element SLL-55-40	40201N	Montech AG	Aluminium, steel
50	Socket head cap screw ISO 4762 M5x16-8.8	501640		Steel
60	U-washer ISO 7092 ø5.3/10x1	502416		Steel

Fig. 33



6. General information

6.1 Environmental compatibility and disposal

Materials used

- Aluminium
- Steel
- Brass
- Bronze
- Wool fibres
- PUR Polyurethane
- PA Polyamide
- POM Polyoxymethylene
- ABS Acrylonitrile-butadiene/styrene
- PS Polystyrene
- NR Natural rubber
- PVC Polyvinyl chloride

Surface finish

- Anodic oxidation of aluminium
- Blackening of steel
- Coating of ABS

Shaping processes

- Extrusion of aluminum profiles
- Machining of metals and plastics
- Injection moulding of plastics
- Foaming of plastics

Emissions during operation

- None

Disposal

Servo horizontal units (SHE-130) or servo vertical units (SVE-130) that are no longer in use are to be dismantled and recycled according to the type of material. The type of material for each part is stated in the spare parts lists. Any non-recyclable material is to be disposed of properly according to materials.